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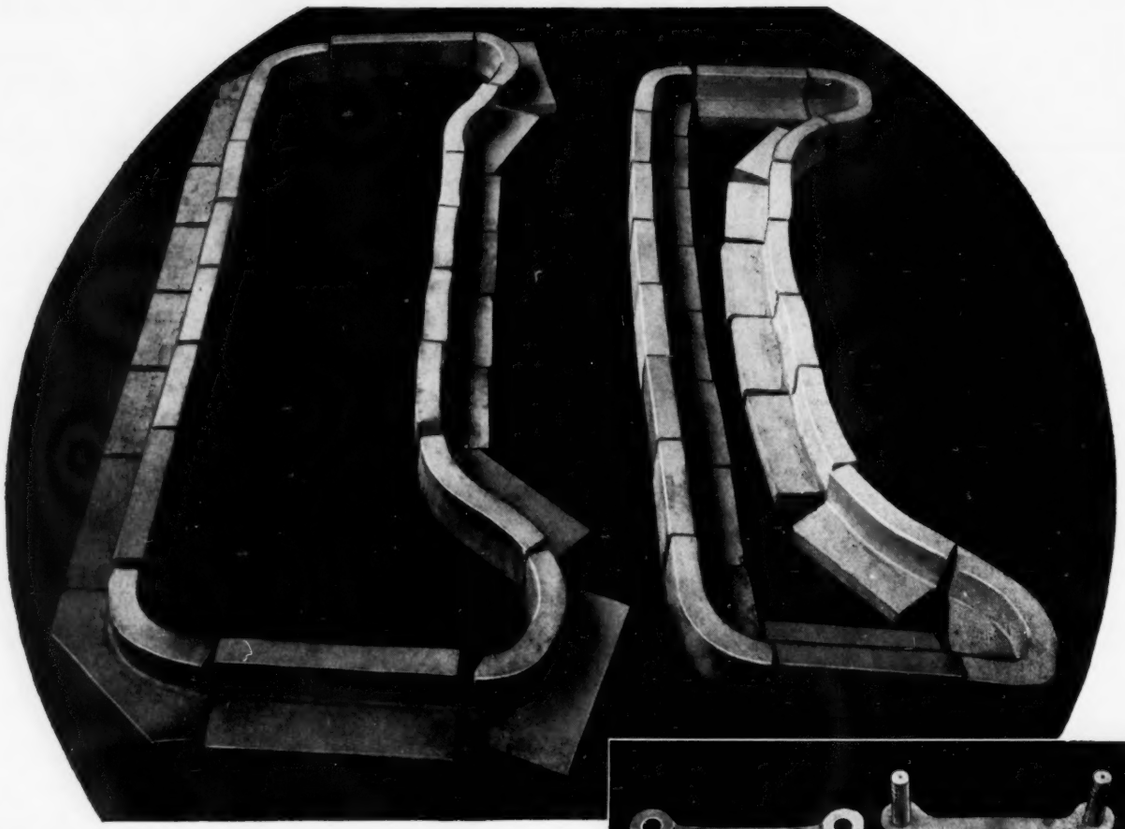

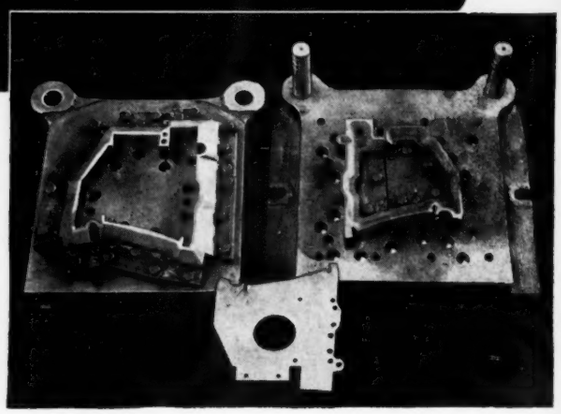

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As the Editor Views the News

ON THE battle monument at Yorktown, Va., commemorating Washington's victory over Cornwallis and the successful conclusion of the war for independence, is this idealistic inscription: "One country, one constitution, one destiny." Following its historic meeting in New York Thursday, when it voted (p. 14) to maintain code ethics, wages and hours and protect labor's right of collective bargaining, the American Iron and Steel institute might well paraphrase it to read: "One industry, one standard of competition, one destiny." To iron and steel, beleagured in a Valley Forge of depression and oppression, the Supreme Court decision increasingly stands out as another Yorktown.

• • •

But just as the colonies found peace only the vestibule to further responsibility as well as opportunity, so steel is finding its new freedom not unalloyed. Grudgingly the government relinquishes its control via NRA; it almost dares industry to recover; it withholds building projects patently to elicit lower prices (p. 16); it is framing its work relief program so that it is a disguised dole and no great hope for material and equipment interests. Imagine allotting $10 per month for materials to keep one man busy building highways; this will scarcely keep him in shovels to lean upon! Nevertheless, no matter how unsportsmanlike the government is, industry must co-operate (p. 27).

Industry Must Go It Alone

• • •

In effect, the government has granted business a reprieve of 9½ months, or till next April 1, in which to recover—or else! Considering that the Supreme Court has put in the footings for this almost-mandatory improvement, the task is not insuperable. Steel demand, while not beyond control, is satisfactorily vigorous considering the season (p. 65). Export trade is a little easier (p. 19) but movements on foot may bring an adjustment; Japan appears to have overplayed its hand by scrapping many of the only bottoms available for this trade! Declines in current production schedules are far from terrifying to automobile manufacturers, who are beginning to place (p. 20) tool and die business for 1936 models. There are rumblings of substantial pipe business about to mature for Mahoning valley mills, and a big lot of sheets for an automobile body builder is on the horizon. Producers of steel are grim in declaring they cannot afford to let prices be chiseled; it will be difficult to sift hope from fact in consumers' price comments over the next few weeks.

Business Good, Thank You!

• • •

A large manufacturer of automobile accessories has replaced 39 automatic screw machines 10 to 12 years old with 16 new machines of the latest type (p. 34), effecting a production increase of more than 100 per cent per machine and affording one more example where the flexibility and adaptability of new equipment is profitable. Machines of this type will be exhibited in large numbers at the national machine tool exposition to be staged in Cleveland, Sept. 11-21. First show of its kind in six years, it will literally disclose revolutionary improvement. It will prove that, for removing metal, manufacturers cannot afford not to re-equip.

Cannot Afford Not To Buy

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By no means, however, does the forthcoming machine tool show monopolize the convention field. To mention only one, there is the National Metals exposition at Chicago, Sept. 30-Oct. 4. In anticipation of this, a report on fundamental combustion data (p. 30) suggesting methods for the more efficient use of industrial gas is timely. So is a study (p. 36) of ingenious jigs and fixtures developed for the manufacture of road machinery by electric arc welding. The gray iron founders ran afoul of the Supreme Court decision last week, having to transform a scheduled clinical observation into an inquest (p. 17), but they proved as flexible as their product.

Gray Iron Holds Inquest

Edwin C. Barringer

Timetable of Iron and Steel, NRA and New Deal

President Roosevelt asks congress to extend NRA from June 16, 1935, to April 1, 1936, for these purposes: To compile a history of the organization; to compare actual business during this period with what it might have been had the full NRA been operative; to supervise the requirement that all government contractors maintain the equivalent of code hours and wages.

Codes are "out." Voluntary ones are not enforceable.

The price situation is wholly an open one again. There is no such thing as a "filed" price. The President makes it clear he has no authority to waive Sherman law provisions and no voluntary agreement on price maintenance may be made if it violates the antitrust laws.

Iron and steel executives, representing 90 per cent of the industry, meet in New York June 6 and vote unanimously to adhere to code hours, wages and fair trade practices. American Iron and Steel institute committees created as the code authority to continue to function, but without power.

Mandatory collective bargaining expires with national industrial recovery act June 16. The administration presumes the Wagner bill will fill this gap. In the meantime, mediation functions of the national steel labor relations board are being transferred to the department of labor.

While the President emphasizes that industry now has an unrestricted field in which to effect recovery, obstacles are apparent. There is talk of invoking the taxing power of the constitution, making taxes so high industry will prefer to expend more of its profits for wages, advertising, etc. Capital resources of large corporations may be taxed to break them up. First insight into the work relief program indicates most of the four billions is earmarked for labor and disappointingly little for material and equipment. Government departments are withholding material awards, hoping for lower prices and making the government the No. 1 chiseler.

The President's resentment at the Supreme Court decision in the NRA and other cases has reacted, costing him much prestige. An opportunity for him to solidify his position, following the admirable bonus veto, has been lost. Congress shies from any thought of a constitutional amendment.

The more the court's rulings are studied the more illuminating and basic they become. They supply the foundation of confidence necessary for restoring business in the 9½-month reprieve granted it.

Some of the President's most important advisers, unwilling longer to work under present conditions and policies at Washington, are leaving. Now appears to be the time for industry to step in and co-operate.

Steel To Maintain Code Ethics, Wages, Hours

IN A SPIRIT and unanimity reminiscent of the stirring times of the World war, the iron and steel industry stands pledged to maintain the fair trade practices, minimum wages and maximum hours prescribed in the now-defunct steel code and to protect employes' rights of collective bargaining.

This decision was reached unanimously last Thursday in New York, when more than 200 executives of the industry assembled for a general meeting of the American Iron and Steel institute. They represented over 90 per cent of the capacity of the country, and no important interest was absent.

Vindicate Earlier Opinion

This general meeting ratified the judgment of directors of the institute, who met Monday. The practical effect is to continue the provisions of the steel code on a voluntary basis, with the exception of price filing.

The matter of prices was not discussed. Prior to the Supreme Court decision, quotations for the third quarter were made effective. There is now no provision for filing or considering prices.

However, Eugene G. Grace, president of the institute, expressed the majority opinion when he declared afterward, in response to newspaper questioning:

"Personally I should expect and certainly hope to see them continue substantially at present levels. I see no occasion for changing them at this moment, either up or down, and certainly the industry can't afford, with its costs and low volume of business, to have less revenue from the business it is doing. And we propose to maintain our present wage rate, which is a controlling factor in our costs. It seems to me that the buying public as well as we producers would find it most inadvisable to start chiseling any place, either at one end of the business or the other."

The sense of the general meeting Thursday, which was held with the full knowledge that NRA has been swept out except for a minor, skeletonized purpose, was expressed in the accompanying resolution.

"The industry has three great obligations," declared Mr. Grace. "First, to preserve fair treatment for labor, second, to deal fairly with the buying public, and third, to exercise an intelligent trusteeship of the funds invested in the industry. I put the obligation to labor first, because the industry's great obligation starts with labor."

Mr. Grace declared it would be suicide for the industry to do any chiseling with the commitments entered into with labor under the steel code.

No Changes Necessary

"Nothing in the Supreme Court decision requires the industry to change its practices of fair competition whch have been adhered to under the steel code," he said. "Nothing in the court decision requires the industry to go back to chiseling of wages, secret rebates, or any discriminatory method of competition."

Mr. Grace pointed out that under employe representation plans, various companies in the steel industry, for many years, had collective bargaining plans in effect. The steel industry, he said, was one of the first to start the share-the-work plan and it has always stood for the open shop, a position which has been staunchly supported by employes themselves.

Referring to the steel code, Mr. Grace observed that the steel industry had developed universal compliance with the provisions of the code, the operation of which had been ben-

Institute's Pledge

RESOLVED, that the members of the iron and steel industry in general meeting assembled this sixth day of June, 1935, hereby unanimously ratify the resolution of the board of directors of American Iron and Steel institute, adopted June 3, 1935, and each of us hereby declares that the company which he represents is in favor of supporting the position taken by such resolution and that it is the intention of such company, acting individually and voluntarily, in so far as it may do so, during the present uncertainty to maintain present rates of pay and maximum hours of labor and the standards of fair competition which are described in the steel code, and that such company will continue to protect the employes' right of collective bargaining.

eficial in many respects to the industry and small companies particularly had benefited from the operations of the steel code.

"In the operation of the steel code," Mr. Grace said, "the industry has had the finest kind of relationships with the government."

Addresses were made by various other steel executives including W. A. Irvin, president, United States Steel Corp.; W. J. Filbert, chairman, finance committee, United States Steel Corp.; E. T. Weir, chairman, National Steel Corp.; S. E. Hackett, president, Jones & Laughlin Steel Corp.; Hugh Morrow, president, Sloss-Sheffield Steel & Iron Co.; T. M. Girdler, chairman and president, Republic Steel Corp.; W. S. Tower, executive secretary, American Iron and Steel institute; W. H. Davey, president, Canton Tin Plate Corp.; and Thomas R. Akin, president, Laclede Steel Co. All urged that the industry stand united in maintaining standards of fair competition.

Grace Tells Reporters

In a later conference with newspaper men Mr. Grace answered questions bearing on many phases of the industry and the future of the institute. He said, in effect:

All of the 200 people I have told you were at the meeting, every man there voted on that resolution unanimously. There wasn't even a criticism of it. It was very spontaneous. . . . The Institute proposes to continue as a part of its activities all the committees, consolidating them where they were specifically code committees, as many of them existed simply because of our code authority operation. Those committees will be set up as committees of the Institute. . . . The Institute doesn't handle labor disputes of the industry. The relationships between employes and employers are individual to each company. . . . There was a labor committee which will be continued, but it had no power to deal with questions of relationships between employers and employes. The labor committee saw to it that they obtained observance of the code. We'll have our commercial committee, our statistical committee, our technical committee, our labor committee. We will continue the reporting of all statistics we now make, substantially the same, but as time goes on the form of the reports may change a little, but we expect to continue the reporting of that kind of information into the Institute so that we may find it available. . . . I assume that there will be a gradual cutting down of some of the personnel and activities of the Institute. We had quite an enforcement organization required under the code. Of course, there is no legal power now of that character. . . . The prices, prior to this code decision, have all been filed by code members covering the third quarter business. Therefore, that question is not a live one at this moment. What the future will hold in store as to what can be appropriate activities of the Institute as to its members, along those lines, only the future can tell. . . . The members are individually and voluntarily responsible for their respective companies. I am assuming that we will all keep in effect our present employe representation plans. If you were asking me that for Bethlehem, that's what I would say. We had collective bargaining long before the NRA came along. Then the NRA came along and took a leaf out of our book. We had it long before and the fellows who didn't before have had it substantially since.

Q. Have you any evidence of price cutting?

A. Not one, thank God! Not one. We believe sincerely in the maintenance of our present labor situation. If you start with that, you can see where you are.

And in Washington—

MEANWHILE, at Washington the situation was bright or lowering for industry according to whether one chose to accept surface indications at full value or, with a skepticism born of contact with the new deal, to attempt to read the future from the past.

Superficially, the decks are cleared. Congress is expected to continue NRA in the skeletonized form proposed by the President. In its reduced state, NRA would write a history of itself, study business as it actually is and as it might have been under the complete NRA, and administer the requirement that government suppliers and contractors adhere to code equivalents in hours and wages.

This attenuated NRA is to extend from June 16, 1935, the official termination date for the original recovery act, to April 1, 1936. Since all compulsion behind codes is gone, voluntary ones are meaningless so far as Washington enforcement is concerned. As passed by the house Friday, apparently codes may be submitted, but sending them to Santa Claus would have the same effect. In regard to wages, hours and ethics, industry is entirely on its honor.

Road Clear to Recovery

Thus it seems that industry has a clear right of way and at last is in position to make good its contention that, unshackled by Washington, it could recover swiftly. But this freedom is tinctured by a spirit that industry should just try to recover, if it can.

For one thing, there is an undercurrent of speculation, prompted by the White House itself, that some sort of vast new program based upon the taxing power of the constitution is in the making. This speculation received some nourishment from the fact congress is expected to be in session at least until Sept. 1. New dealers believe the taxing power of the government is shockproof and invulnerable, whereas the commerce

The Wise Men of Bethlehem

Down through the years they have come, literally arm in arm, in one of the finest friendships and business relationships in the steel industry—Charles M. Schwab, chairman of the Bethlehem Steel Corp., at the right, and Eugene G. Grace, president of Bethlehem, at the left. Acme photo

clause of the constitution proved a weak reed.

Still in a most formative stage, any new deal adjunct predicated upon taxing power apparently would have as its objective the levying of such heavy imposts on profits as to induce industry to distribute its profits among wage earners rather than pay them into the treasury. Its purpose, apparently, would be more punitive than revenue producing.

Asked last week what the incidence of such a program would be upon corporations not conspicuously in the profit area, a person close to the new deal speculated that capital resources might be levied upon, and one phase of this development might be a split-up of large holding companies in steel and other industries.

This indicates an underground link with the Wheeler-Rayburn bill, destined to kill off large utility holding companies but believed by some to be a menace to large aggregations in steel as well.

Work Relief a Dole

Another invisible hobble on industry is the manner in which the four billion dollar work relief program is shaping up. There is every indication that, as regards highways and grade crossing elimination, in which steel and equipment manufacturers have expected to participate in generous measure, labor will get the lion's share and that this facet of the program may be little more than a concealed dole.

It is proposed to pay men working on highways $90 a month, or $1080 a year. For each man the tentative allotment for material is $120, making the annual outlay per man $1200. It is not believed that many reinforced concrete highways can be built on $120 per man per year for materials, and that most new roads will be dirt ones. One estimate is that reinforced concrete roads require an annual expenditure of $2000 per man for labor and materials.

How there can be much diminution of structural steel and reinforcing bar requirements in grade crossing eliminations is difficult to discern, yet it is being said freely in Washington that material and equipment makers are going to be sadly disappointed.

Awards of general and material contracts for government buildings have been slowed up to the extent that suspicion has arisen that the government is awaiting a change in the price situation. It will be recalled last week bids for paper for the government printing office were sidetracked in the expectation that a codeless paper industry would reduce its quotations.

Thus, whatever the motive, with the government holding back awards of buildings, diverting a larger percentage of work relief funds to labor, and hinting at a big tax program, industry may have to recover over the next 9½ months without what would be considered reasonable and legitimate co-operation. In effect, the government virtually dares industry to recover.

Still another unknown quantity is the Wagner labor disputes bill. It is rumored that, as amended, this controversial measure will satisfy industry, but with collective bargaining dying with the original recovery act next Sunday, organized labor is not likely to relinquish this leverage on industry so easily.

All of the special labor boards, including that for steel, automatically pass out next Sunday with the original NRA. The revised Wagner bill is expected to continue many of their functions but in the meantime their facilities for mediation are being transferred to the department of labor and $600,000 is being appropriated for them.

As part of the slate-wiping process, all cases pending before the steel board have been dismissed by order of the President, including actions involving the Illinois Steel Co., Carnegie Steel Co., Wheeling Steel Corp., Youngstown Sheet & Tube Co., Pittsburgh Steel Co., Woodward Iron Co., Berger Mfg. Co. and Moline Iron Works. Newspapers have said that the Weirton Steel Co. case, in which the government was roundly beaten, has also been dismissed, but there is no record of this in the official statement.

Asked last week concerning the extent to which code equivalents in hours and wages would be required of government suppliers, the President indicated that only actual facilities engaged on government work will be included. In other words, a company supplying reinforcing bars for any government project must enforce code hours and wages in its bar department, but not necessarily in any other department.

Personnel Being Deflated

Who will rule the skeletonized NRA, whether it will be one man or a board, had not been decided by late last week. William P. Witherow, of Pittsburgh, whose name has been identified with the Steel Products Co., Witherow Steel Co., and Dilworth Porter Co. and other enterprises, is resigning from the national industrial recovery board June 16. So is Donald Richberg, its chairman.

Washington believes that industry, having operated to advantage under the fair trade practices set up by codes, will not readily relinquish this gain. Typical is the steel industry, which, at New York Thursday, voted to continue its trade practices.

Obviously, with no more code authority, there are no teeth in these practices and adherence is entirely a voluntary matter. So far as known, the only manner in which compulsion can be injected is via the federal trade commission, whose hands are greatly strengthened by the overthrow of NRA. In fact, legislation to reinforce this phase of the commission's activity is being drafted on Capitol Hill.

As far back as 1919, the commission established the procedure of holding conferences for the purpose of eliminating unfair methods of competition or any trade abuses. Although the trade commission has not pushed its priority in this field during the life of NRA, a division for trade practices has been maintained. In event the steel industry desires to buttress its trade practices the trade commission, it can be stated, will welcome negotiations.

Scope of Trade Practices

Generally, trade practices as approved by the trade commission fall into two groups. The first are general rules which are common to practically all industry and through experience have been found enforceable at law.

These include inhibitions on defaming competitors, substituting inferior materials, maliciously inducing or attempting to induce breach of contract, discrimination in price, deviation in standards, secret rebates, and selling below cost with intent to injure a competitor. The second group of trade practices usually embraces definitions and procedure peculiar to the industry.

Following trade practice conferences held under auspices of the trade commission, the resulting rules are submitted to the entire industry and a majority required for their adoption. The enforcement machinery consists first of negotiations—a majority of violations being settled by stipulation—followed by "cease and desist" orders enforceable in the courts.

In the year ended June 30, 1934, trade practice rules were accepted by approximately 2400 individuals, firms and corporations. Among the industries which have held trade practice conferences since 1919 are iron and steel scrap, structural steel, steel office furniture, plumbing and heating, reinforcing steel fabricating, lightning rod, furnace pipe and fittings, steel office furniture, solid section steel window, ingot brass and bronze and saw and blade service industries.

Concerning price control, Washington regards this as definitely out. It is believed that there are not enough lawyers in the United States to draw up an open price plan that would satisfy the federal trade commission and the department of justice. Said Attorney General Cummings Thursday:

"We will be confronted with another situation if business continues

(*Please turn to Page* 24)

Gray Iron Founders Strive To Salvage NRA Gains

DETERMINATION to preserve coordination and co-operative action which had been stimulated by NRA was expressed by almost 100 gray iron jobbing foundry owners who convened at Cincinnati, June 6 and 7.

This general industry meeting, scheduled a number of months previously, quickly was revamped by its officers to meet the new conditions resulting from the Supreme Court decision which invalidated the gray iron industry code.

In the keynote address by the president of the Gray Iron Founders' society, Franklin R. Hoadley, Farrel-Birmingham Co. Inc., Ansonia, Conn., the point was emphasized that more than 1800 jobbing foundries, representing 73,000 employes with 300,000 dependents comprised the industry.

Mr. Hoadley cited the dependence of these people as a great responsibility which can be fulfilled only through collective activity and the development of a system not based upon a compulsory procedure which had been found to curtail production, increase costs and magnify sales resistance for the gray iron industry. He pointed to the favorable outlook which is based upon the cessation of immigration, broadened markets, the delayed replacement of obsolete equipment, low interest rates and improved understanding of basic business principles.

Urges United Industry

James W. Hook, Geometric Tool Co., New Haven, Conn., luncheon speaker Thursday, drew a broad general picture of the problems dropped on industry's doorstep by the collapse of NRA. Mr. Hook, vice chairman of the durable goods industries committee and through a great part of the life of NIRA a member of the industrial advisory board in Washington, stressed the need of organizing industry if its voice and influence are to have any influence in the new social and legislative thought of a people moved by the trials of five years depression.

Mr. Hook urged that manufacturers unite to accomplish the basic concept of NIRA through spreading employment, maintaining wage rates, outlawing child labor and observing those trade practices which are just and fair. Recognition of a maximum hour "ceiling," a compromise of industry, was held by the speaker to have been a greater loss than any point surrendered in the bargaining which constituted code formulation. Price fixing is out for a long time to come.

The tendency of labor legislation has a definite trend toward a federalized control distasteful even more to the workman than management. If business improves over the next few critical months, the speaker stated that the recent experience with NRA would gradually be forgotten. However, if there is a substantial slump congress again may attempt federal control and supervision over the industrial system.

A complete and detailed review of the executive staff of the gray iron code authority was presented by Henry M. Halsted Jr., executive vice president. He offered a summary of 13 points covering the activities of the office staff of 18, ranging from compilation of statistics, preparing briefs on code definitions and procedure, to the preparation and distribution of reports, letters and bulletins reaching the staggering total of 101,270 or more than 351,000 sheets of paper within the period of one year. He defined the industry as composed of 1847 companies doing an annual business of more than $114,000,000 in 1934. Tonnage increased 39 per cent and sales volume 44 per cent in 1934 over 1933.

Report of the treasurer, R. D. Phelps, Francis & Nygren Foundry Co., Chicago, was read by Mr. Halsted. This showed that with a budget of $107,923 for the first 11 months of code administration, a total of $94,847 had been assessed, $85,418 collected and $64,600 disbursed, leaving a surplus for that period. For the second period the budget was $128,120 and with only two quarters assessed payments had been made establishing a surplus of $6600.

In opening the sessions, President Hoadley outlined the action of the code authority which canceled items of expense, including many of the features of the projected Cincinnati meeting, the reduction of the staff to four persons, and other steps in retrenchment. Existing obligations are to be liquidated as quickly as possible and pro-rata refund made.

Co-operation Still Needed

C. B. Magrath, North Western Foundry Co., Chicago, vice president of the society and the code authority, strongly urged the members to preserve the gains made through industry co-operation. He stated a definite need exists to find means of discouraging competitive price cutting, of carrying on cost education, establishing fair trade practices, eliminating waste and exerting some activity to represent industry politically.

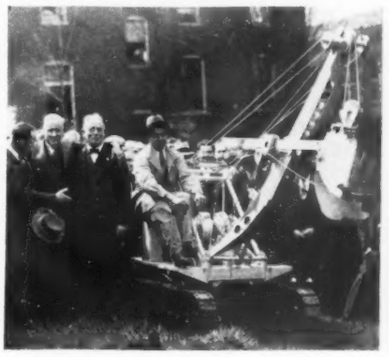
Following a discussion of the proposal that the industry continue to function through a trade association participated in by members from the floor, the chairman was requested to appoint two committees to report to the Friday morning session. These were as follows:

On proposed activities: Walter L. Seelbach, chairman, Forest City Foundries Inc., Cleveland; W. D. Bowdry, Dallas Foundry Inc., Dallas, Tex.; George Branston, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.; A. W. Lemme, Elizabeth Street Foundry Co., Chicago; Frank M. Robbins, Ross-Meehan Foundry Co., Chattanooga, Tenn. A. C. Ziebell, Universal Foundry Co., Oshkosh, Wis.; and J. T. Smith, North Jersey Foundry Co., Little Falls, N. J.

On methods of financing: H P. Hubbell, Semisteel Casting Co., St. Louis; R. E. Kucher, Olympic Foundry, Seattle; H. S. Washburn, Plainville Casting Co., Plainville, Conn.; A. C. Denison, Fulton Foundry & Machine Co., Cleveland; J. H. Pohlman, Pohlman Foundry Inc., Buffalo; W. J. Grede, Liberty Foundry Inc., Wawautosa, Wis., and with Don McDaniel, Decatur Casting Co., Decatur, Ind., as chairman.

Directors, chosen by the nominating committee, were elected and met late Friday to select new officers.

It Moves the Earth



Said to be the smallest power excavator in the world, this power shovel is an exact half-size duplicate of the new P & H bantam weight unit. It has a capacity of 3/16-yard and is electrically powered. It was used recently for breaking ground for the new employes' welfare building of the Harnischfeger Corp., Milwaukee. Beside the diminutive shovel is seen R. von Schleinitz, vice president, with the firm's oldest employe, Henry Riemenschneider, who has a service record of more than 40 years

WINDOWS OF WASHINGTON

WASHINGTON

ST. LOUIS should understand that it has no monopoly on the nicknames it has attached to the Cardinals' two famous pitchers—Dizzy and Daffy Dean. Another week like the past one and everyone attempting to follow the new deal since the Supreme Court put it in its place will be both.

Follow the situation chronologically. While the administration had discussed the possibility of an overthrow of NRA, nevertheless the Supreme Court decision of May 27 caught it completely napping. The first reaction visible to the public, outside of consternation, was the President's statement at his press conference Friday morning, May 31.

So vehement a discussion of a public matter has rarely been vented in Washington, let alone in the White House itself. There have been two diagnoses—one that the President was an angry, frustrated man thrown off his balance by the decision, or that he was deliberately unrestrained and intemperate. The majority opinion favors the former.

Popular Accord Lacking

Over the weekend the reaction of the country began pouring in on Washington, and it was almost unanimously hostile to the President. The reference to a return to the "horse and buggy" stage was particularly unfortunate. The thought of amending the Constitution proved abhorrent. Incidentally, rarely has a President been talked to as Mr. Roosevelt was by some businessmen within his official family.

Last Tuesday morning it was generally understood that legislation for a permanent NRA within the limitation of the Supreme Court decision and including voluntary codes was to be drafted. The talk in Washington is that Donald Richberg, head of the national industrial recovery board and regarded as No. 1 assistant to the President, left the White House Tuesday morning convinced that NRA would be continued.

At the cabinet meeting called for that morning and running well into the afternoon, the President still was understood to be of the opinion that something approximating a permanent NRA should be adopted.

But between then and 3 o'clock, when the President conferred with three representatives of the senate and the house, something happened, this something being believed to be Dr. Felix Frankfurter.

Only a Skeleton Now

At any rate, at 5 p.m. last Tuesday it was announced that NRA on anything approaching a permanent base would not be considered, and the announcement concerning a skeletonized NRA (page 15) was made.

At this conference, instead of talking extemporaneously as on Friday, the President read from a prepared statement. The "personal charm" of the President was again in evidence and there was a complete reversal of the upset attitude of the previous Friday.

Meanwhile, during Tuesday the report was abroad that Mr. Richberg had been instructed to keep the NRA organization, and there was joy among the 4200 in Washington and the 1200 out in the provinces. This joy was dashed to the ground Tuesday night when the skeletonized form of NRA was announced.

Then on Wednesday morning, at a press conference held by a secretary to the President, it was intimated that the President might ask for some permanent industrial control legislation through the taxing power of the government. This intimation was confirmed later by Speaker Byrnes, and that is where the matter stands today, with much speculation concerning the form this program may take. It has possibilities even greater than NRA for retarding business recovery.

Thus, the situation in Washington still is one of great confusion. While NRA is moving out of the picture, the nebulous taxing program, calculated to make industry distribute more of its profits in wages, is an unknown quantity.

Among industrial representatives who have followed developments in Washington there is a heavy sense of disappointment that industry is on the hottest spot yet.

The fact is, that industry has been dared to recover, it has been given until April 1 to prove itself, and in the meantime it is likely that the government, instead of co-operating, may dilute such normal assistance as might be expected from the work relief program, government building, and a generally placid legislative situation.

As some new dealers view it, the situation is a setup for the President. Next April 1 will be April fool's day for everybody but the President, they contend. If industry has recovered, he can take the credit for having set the stage. If it has flopped, then this will be only so much more proof that industry is not yet ready to be weaned from the government.

Opportunity Muffed?

There is also a sense of disappointment that the President failed to grasp a golden opportunity last week. After his bonus veto, which everyone has applauded as a great document, he had the opportunity to accept the Supreme Court decision gracefully, be sportsmanlike about it, and further establish himself. Instead, he supplied additional proof of an obsession that in some manner the new deal must continue to put crutches under business.

Capitol Hill is getting to be a little skittish of the situation. Like the President, its chief objective now is re-

election in 1936, and it is a natural instinct for congress to wrap itself in the folds of the cloak of a successful and popular President.

But not even the most ardent Democrat wants to touch such a doubtful thing as a constitutional amendment at this time; even he is aghast at the aspersions cast upon the Supreme Court. The universal wish in congress is to pack up and go home promptly before more hot potatoes are handed it, but there is talk that Sept. 1 is now the upset date.

If the Supreme Court should rule against a revised Wagner bill, drawn after the guides set up in the Schechter, Humphrey and Frazier-Lemke Decisions, the last bit of self respect would vanish from the Capitol. Congress is in a position where the Supreme Court has said it dare not delegate its power, and yet it both hesitates and is restrained from using it.

Immediately facing congress is a new "must" program of the President. This program consists of about 14 bills, including temporary NRA, social security, Wagner labor disputes, Guffey coal stabilization, and the bill stipulating government suppliers must adhere to code equivalents in hours and wages.

FOREIGN TRADE SITUATION SLIGHTLY BEFOGGED

It is almost as easy to follow the gyrations of foreign trade over the past few days as it is to track down the maneuverings of the new deal.

With the elimination of George N. Peek as special adviser to the state department, Secretary Hull is freer now to pursue his program of reciprocal trade agreements. These agreements are not to the liking of the iron and steel industry, as on the whole, they open the door to heavier imports.

Naturally, with price control definitely disposed of, the temptation of producers to meet reduced foreign prices along the seaboards will be greater. Probably in this field lies the greatest danger to maintenance of present levels.

In April, it develops, exports of iron and steel toppled severely, chiefly due to lessening outward shipments of scrap. Two causes are advanced: Japan is experiencing some contraction in business and needs less scrap; it is increasingly difficult to obtain cargo space, inasmuch as Japan has scrapped many vessels in this trade.

Still another obstacle to foreign trading is the increasing disposition of countries not to permit exports of their own money. In other words, if the mythical kingdom of Ruritania wants to buy American scrap its nationals are restricted to the amount they can import by paying in American currency.

This department has long been too optimistic on Russian business, but a sizable piece of it was broken off last week when Amtorg awarded Alco Products Inc., a subsidiary of American Locomotive Co., a contract for $1,200,000 worth of oil refinery equipment. This contract will be filled at Dunkirk, N. Y., shipped this year, and will be paid for in cash at New York. More Soviet negotiations are on than either Amtorg or the domestic manufacturers will admit.

CODE AUTHORITIES WARNED AGAINST EXPENDITURES

Prentiss L. Coonley, NRA code administration director, has notified all administration members of code authorities that "in view of the recent decision of the Supreme Court in the Schechter case, declaring section 3 of NRA unconstitutional, you are directed to take no action in your official capacity as an administration member which will have the effect of changing the status of any member of industry, and which will implicate the administration in the slightest manner in the expenditure of money by or in continuation of code authorities.

"Since code authorities have no legal validity, you are also directed to attend no code authority meetings as an official representative of NRA. Until further notice no travel or per diem vouchers will be honored. This is in accordance with instructions issued to all division adminstrators, deputy administrators, and administration members, dated May 29."

Administration members have been asked to co-operate unofficially, however, with secretaries of code authorities in collecting information asked for in the following telegram sent out by NRA:

"It is requested that you co-operate with administration in furnishing all available factual information of changes from code provisions by members of your industry in wages, hours and working conditions. Reports by telegram our expense are desired daily until further notice to reach me before three o'clock afternoon covering current day as far as possible. Important to differentiate between fact and rumor."

Meetings

STEEL Club of Philadelphia will hold its annual outing June 21 at the Aronimink Golf club, near Philadelphia, where the Steel club has held similar outings in recent years. Arthur L. Meyer, vice president, Alan Wood Steel Co., Conshohocken, Pa., is president of the Steel club.

MAPI TO MEET JUNE 26

Machinery and Allied Products institute, 221 North LaSalle street, Chicago, has scheduled a meeting of all MAPI members at the Statler hotel, Cleveland, June 26, meanwhile urging no changes in wage and hour schedules.

ON PROGRAM TO ADDRESS INDUSTRIAL ADVERTISERS

On the program of the industrial advertising departmental meeting at the convention of the Advertising Federation of America, and sponsored by the Engineering Advertisers association, Chicago chapter of the National Industrial Advertisers association, and the Chicago Dotted Line club of the Associated Business Papers Inc., at the Palmer House, Chicago, June 11, are L. S. Hamaker, Berger Mfg. Co., Canton, O.; H. F. Barrows, Austin-Western Road Machinery Co., Aurora, Ill.; Walter Buchen, the Buchen Co. Chicago; Paul S. Wooton, McGraw-Hill Co., Washington; Herman Lind, National Machine Tool Builders' association, Cleveland; G. E. Stedman, Cramer-Krasselt Co., Milwaukee, and G. D. Crain Jr., publisher, *Advertising Age*.

HOUSTON GETS TRADE MEET

National Foreign Trade council, 26 Beaver street, New York, has chosen Houston, Tex., for its twenty-second convention, Nov. 18-20. It will follow the convention of the American Bankers' association at New Orleans, Nov. 11-14. James A. Farrell, retired president of the United States Steel Corp., is head of the council.

Quad City Foundrymen Become Chapter of AFA

Foundrymen of the Illinois-Iowa area adjacent to Davenport, Moline, and Rock Island and organized as the Quad City Foundrymen's association have decided to affiliate with the American Foundrymen's association as a chapter of the latter organization.

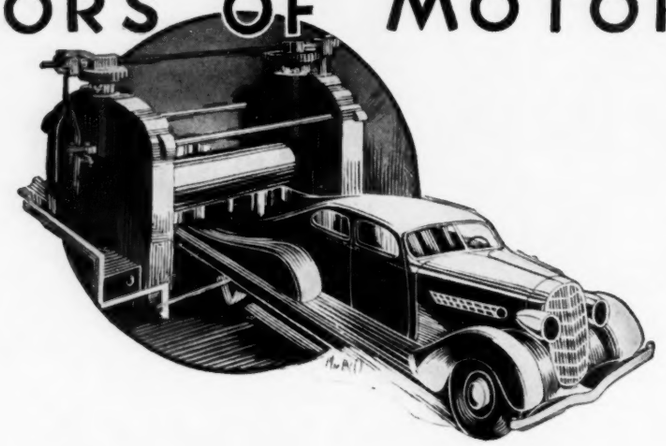
The following officers of the new chapter have been elected: President, A. E. Hageboeck, Frank Foundries Corp.; vice president, Thomas Frank, Frank Foundries Corp.; secretary, J. Morgan Johnson, secretary, Tri-City Manufacturers' association.

The following will compose the board of directors: P. T. Bancroft, H. Bornstein, F. W. Kirby, John H. Ploehn, C. F. Scherer, M. J. Gregory, H. F. Henninger, Clyde Burgston and E. W. Gullberg.

Cadets Inspect Ludlum

West Point cadets of the class of 1935 inspected the Watervliet, N. Y., plant of the Ludlum Steel Co., June 3, to view the manufacturing operations of a steel plant devoted to the manufacture of high speed tool steels, stainless steels and other electric furnace alloys.

MIRRORS OF MOTORDOM



DETROIT

NOTHING has yet developed to indicate any deviation from the plan for staging the New York automobile show the week of Nov. 2-9, and presumably nothing will unless an extraordinary burst of demand should impel manufacturers to run through the remainder of the year on current models.

Accordingly, development work on new models continues unslackened, and tool and die makers are on the verge of closing some substantial business. The first large program to mature probably will be that of Terraplane-Hudson, and contracts are expected any day.

Terraplane-Hudson, it will be recalled, makes its important changes biennially, and 1936 is the model year in which a general changeover is due. For one thing the running board will be straightened out. Fender lines will be radically changed. Doubtless the new radiator grille will be die-cast.

For the remainder of this model year Hudson will offer a new sedan, known as the country club model, on a 124-inch wheelbase chassis, priced at $880, with the electric-hand gearshift extra. Incidentaly, those G-men of the department of justice who are tracking down the Weyerhaeuser kidnapers are burning up the highways in Hudson eights. Nothing is so fast when the traffic light turns green as a Hudson eight in the hands of a man who can flip the electric hand rapidly.

More Stainless in 1936

Another harbinger of the approach of model changes is the activity at the Ternstedt Mfg. Co., the General Motors subsidiary devoted to interior trim and other bright parts. It is understood to have started already on the hardware for the new standard Chevrolet, and parts for other new GMC cars are not far behind.

At the outset, 1936 looks like a better year for stainless steel manufacturers than any in the past, except when Ford was making its radiator grille of stainless. Generally speaking, in the past the producers of this steel have had to adapt it, but now designers are beginning to show some initiative.

Some new ideas for brightening interior trim, especially at window openings, are being considered. The fact that a stainless steel body for a car of the Ford class costs about $140 more than the orthodox body of sheet steel is a potent barrier, although several stainless steel test bodies still are running around Detroit.

There is the possibility that one large manufacturer of cars may go to rubber seats in one line in 1936, which is bad news for wire mills and fabricators. One design is based upon the use of rubber cells, with a top layer of sponge rubber. These cells, however, would not be inflated. It is claimed that rubber seats follow the body contour closely. It may not be significant, but one of the largest makers of coil springs for seats is beginning to do a big business in the manufacture of refrigerator shelving from stainless steel wire.

Use of Rubber Bounds

Speaking of rubber, the quantity used in Ford cars has trebled in eight years. Model T contained only 56 pounds, the present V-8 about 164 pounds, and a use of 200 pounds per car is in sight. As an example of the tests to which Ford puts rubber compositions, steering wheels are exposed 12 hours to a temperature 20 below zero, then expected to withstand a fall of 6 feet.

This switch from seat springs to refrigerator shelving is no more radical than Chrysler entering the business of air-conditioning railroad passenger equipment. Its subsidiary, Airtemp Inc., is doing eleven diners for the New York Central and four for the Pennsylvania.

Going into the home-stretch of the first half year, Chrysler wishes all its divisions had done as well as Dodge. In five months, Dodge production has totaled 147,000, an increase of 60 per cent over the 92,000 of the same period of 1934. Dodge alone has made almost as many cars as Olds and Pontiac together, notwithstanding the phenomenal showing of these two General Motors jobs.

Plymouth has produced 226,000 units against 198,000 in the first five months of 1934, a gain of 14 per cent. Stripped of many of its features of 1934, Plymouth has made relatively more money for the Chrysler Corp. this year than last, but, as related last week, is scheduled for a rather complete redesign for 1936.

Of the other Chrysler cars, DeSoto output shot up to 18,000 in the opening five months, compared with 9300 a year ago, an increase of 90 per cent due to the fact it had something more than the airflow series to offer. Chrysler cars were practically unchanged at 27,000 jobs this year and 25,000 a year ago. The new airstream series on Chrysler chassis will improve this showing over the next few months.

Taken as a corporation, Chrysler production from Jan. 1 to May 31 totaled 418,000 units, up 31 per cent over the same period of 1934. General Motors assembled 634,000 jobs, a gain of 10 per cent. Ford, meanwhile, has been running away with the show with a total of 698,000, or an increase of 70 per cent. Chrysler has been decelerating fast the past week, laying off many men and curtailing production to 16,900 units.

Figures Reflect Good Business

From the standpoint of individual cars, Olds takes the banner thus far in 1935, its record of 87,000 units being 135 per cent greater than the 37,000 jobs of the opening five months of last year. Nash was second with a total of 31,000, an improvement of 106 per cent. Packard actually tops them all, making 15,000 this year against only 2500 a year ago, but it has added its medium-price line, throwing the comparison askew.

Believe it or not, despite the general impression that 1935 has been a mighty good automobile year there are

some good names that have not equaled their 1934 showing. These include Lincoln, Terraplane - Hudson, Buick and Pierce-Arrow, and among the trucks International Harvester and White-Indiana. Only by the narrowest of margins have Chevrolet, Chrysler, Studebaker, Willys and Mack trucks bettered 1934.

Willys, incidentally, is displaying more vigor, and court consent to make 10,000 to 15,000 more jobs is sought. There are some districts, notably the Pacific coast, where the streamlined Willys enjoys a comparatively good market and given a breathing spell this Toledo interest may yet work out of its difficulties and become a good property. There is now some doubt whether model 99, designed as a 6-cylinder job to supplement the present 4-cylinder 77 model, will be brought out.

Europe Likes Noise

Some observations by David E. Anderson, chief engineer, Bohn Aluminum & Brass Corp., on returning from Europe: High-speed roads in Italy and Germany are forcing those countries to adopt American practice . . . Low as American cars are, the English want them still lower . . . Outside of France the Ford is considered a big car on the Continent, and in Germany it costs over $1500 at present exchange . . . Europeans like an engine to roar because it suggests speed . . . English owners belittle American cars, but English engineers admire them . . . Higher speeds are compelling European cars to be designed along American lines in regard to bearings, lubrication and safety factors.

The recent talk, quickly hushed, about constructing air bases as protection against a possible enemy invasion via Canada called attention to the fact that 90 per cent of this country's automobile-manufacturing capacity is virtually at the border. Airplane engine manufacture, centered at Hartford, Conn., and Paterson, N. J., obviously is equally near the Atlantic coast. Detroit groans every time it recollects that despite all the progress it has made in internal combustion engineering, it has not been able to corral the airplane business.

Labor

REPRESENTATIVES of the Western Bar Iron association and the Amalgamated Association of Iron, Steel and Tin Workers, at a meeting in Chicago, June 5, agreed to extend the present bar iron mill wage contract for one year beginning July 1. The sheet and tin plate mill wage contract also was extended for a year at a recent meeting of representatives of the Western Sheet and Tin Plate Manufacturers association with the Amalgamated.

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1933	1934	1935
Jan.	128,825	155,666	292,817
Feb.	105,447	230,256	335,699
Mar.	115,272	338,434	429,834
Apr.	176,432	352,975	477,716
May	214,411	330,455	*425,000
5 Mo.	740,387	1,407,786	*1,961,066
June	249,727	306,477	.....
July	229,357	264,933	.....
Aug.	232,855	234,811	.....
Sept.	191,800	170,007	.....
Oct.	134,683	131,991	.....
Nov.	60,683	83,482	.....
Dec.	80,565	153,624	.....
Year	1,920,057	2,753,111	.....

*Estimated.

Estimated by *Cram's Reports*

Week ended:	
June 1	65,675
June 8	87,755

Production

STEELMAKING continued to lose ground last week, declining 1½ points to 41 per cent. Pittsburgh, off 4 points, and Wheeling, off 14, contributed largely to this loss. Although finishing operations are being sustained on such contracts as were placed prior to the decease of NRA, there is little new demand for iron and steel. Details follow:

Youngstown—Remained at 48 per cent last week, with 38 open hearths and two bessemer converters in the district operating. Indications are for a decline to 46 per cent at this week's start, according to tentative mill schedules.

Wheeling—Off 14 points last week to 48 per cent, with 18 out of 37 open-hearth furnaces active.

Pittsburgh—Off 4 points to 32 per cent last week, due to a steady dwindling in steel demand since the Supreme Court decision on NRA. Another unfavorable factor during the week was the closing of the open-hearth department of a district independent for the purpose of restricting inventories, inasmuch as its fiscal year closes June 30. Ingot operations of the two leading interests were calculated at around 30 to 35 per cent, respectively.

Twenty-one out of 60 steelworks blast furnaces continued active. National Tube resumed with a second McKeesport stack, but Pittsburgh Steel temporarily banked its one active Monessen, Pa., furnace. Carnegie is operating 8 of 32; Jones & Laughlin, 6 of 11; National Tube, 2 of 4; 1 of 2 each for Pittsburgh Crucible and American Steel & Wire, and Bethlehem Steel, 3 of 7.

Buffalo—Held at 37 per cent, with indications of a drop of about 2 points this week. Lack of large rail and structural tonnage is having an adverse influence on the local market.

Birmingham—Down 2 points to 52½ per cent last week, with 11 open hearths active. Rail rolling will continue until about the middle of this week when five open hearths will be closed down, bringing the rate down to about 30½ per cent.

Detroit—Held at 94 per cent last week, with no immediate change indicated.

New England—Off 3 points to 60 per cent last week, with indications this rate will be held, and probably increased slightly.

Chicago—Unchanged at 43 per cent, one producer curtailing slightly and another showing an increase. Small downward changes are anticipated the next 30 days. Blast furnace schedules are steady, 14 of 36 steelworks stacks being active.

Cleveland-Lorain—Unchanged at 54 per cent, Corrigan, McKinney Steel Co. continuing with seven open hearths, Otis Steel Co. four, and National Tube Co., Lorain, ten.

Central eastern seaboard—Unchanged at 29½ per cent, notwithstanding the decline in new buying over the past two weeks. Finished steel specifications are fairly sustained for much of such work as was definitely set to go ahead prior to the NRA decision, and in some cases producers are maintaining their melting operations to build up semifinished stocks. Products tending to support ingot production are tin plate and wire. Some sizable structural tonnage placed a while ago also is being reflected in current steelmaking operations. There have been changes in steelmaking rates at individual plants, with one mill last week suspending ingot production entirely, but developments have balanced, thus sustaining the general average.

Steelmaking Operations

Percentage of Open Hearth Ingot Capacity Engaged in 10 Leading Districts

	Week ended June 8	Change	Same week 1934	Same week 1933
Pittsburgh	32	— 4	54	35
Chicago	43	None	70	41
Eastern Pa.	29½	None	46½	25
Youngstown	48	None	66	52
Wheeling	48	—14	79	84
Cleveland	54	None	78	76
Buffalo	37	None	55	33
Birmingham	52½	— 2	55	50
New England	60	— 3	70	60
Detroit	94	None	100	38
	41	— 1½	62	48

Industrial Men in the Day's News

P. A. McKittrick, New President, Air Conditioning Manufacturers' Association

A native of Canada, he came to this country at an early age and worked in New England shops.

For 17 years he has been affiliated with a leading manufacturer of air conditioning equipment.

He has been especially active in civic affairs and holds memberships in a large number of societies.

PERCY A. McKITTRICK, recently elected president of the Air Conditioning Manufacturers' association at its annual meeting in Hot Springs, Va., is treasurer and general manager of the Parks-Cramer Co., Fitchburg, Mass., manufacturer of air conditioning equipment.

Born in Chelsea, Que., he was educated there and in Lowell, Mass. His first work was with the Lawrence Mfg. Co., Lowell, and after four years with this interest he became associated with the Lowell Machine Shop as assistant to the treasurer.

The next 19 years he served as bookkeeper, paymaster, purchasing agent, office manager, chief accountant and assistant foreign sales manager. In 1918 he removed to Fitchburg and was appointed assistant treasurer of the reorganized Parks-Cramer Co. He was elected treasurer and general manager in 1931.

In Mr. McKittrick's own words, he has "assisted in approximately 387 financial and 29 chamber of commerce membership drives, one political campaign, numerous church socials and three baptisms, including my own."

From 1916 to 1926 he was special lecturer on business subjects at Massachusetts Institute of Technology. He has memberships in a long list of technical societies, civic organizations and other groups.

♦ ♦ ♦

William P. Witherow, one of the two representatives of industry on the national industrial recovery board and formerly a resident member in Washington on the national industrial advisory board, has resigned as of June 16, severing his connections with NRA.

Prior to serving with NRA, Mr. Witherow was president of the Steel Products Co., Pittsburgh, a post he has retained. Before that he was a vice president of the Republic Steel Corp., chairman of the Donner Steel Co., and president of the Witherow Steel Co. and Dilworth, Porter & Co.

♦ ♦ ♦

Robert T. Harris, formerly managing director of the British affiliates of Blaw-Knox Co., Blawnox, Pa., has been placed in charge of a consolidation of several Blaw-Knox departments now marketing construction equipment. The consolidation has been effected to handle adequately the demand expected from public works programs.

♦ ♦ ♦

Lyman C. Athy, metallurgical and ceramic engineer of Detroit, has been appointed superintendent of manufacturing operations for the new plumbing division of Briggs Mfg. Co., Detroit. A graduate of Ohio State university, he formerly was in charge of enameling research for the General Electric Co., in which capacity he directed development and manufacture of enamel frits. Later he was commercial representative for several frit manufacturing companies.

Harry G. Franklin, for over 20 years a plumbing and heating contractor in Cincinnati, has been appointed regional manager of the Briggs plumbing division for the west-north central territory, covering North and South Dakota, Nebraska, Kansas, Missouri, Illinois and Wisconsin.

J. B. Stewart, identified with sales developments in the plumbing and brass industries for over 20 years, has been appointed regional manager of the new Briggs division for the east-north central territory, covering Michigan, Ohio, Indiana, Kentucky and the western sections of New York, Pennsylvania and West Virginia.

♦ ♦ ♦

Charles R. Hook, president of the American Rolling Mill Co., Middletown, O., gave the commencement address June 6 at the Michigan College of Mining and Technology, Houghton, Mich. He was also awarded the honorary degree of doctor of engineering.

♦ ♦ ♦

F. H. Rosencrants has been elected a vice president of the Combustion Engineering Co. Inc., New York, to have charge of the proposition engineering department. For a number of years he was mechanical engineer

F. H. Rosencrants

with the Electric Bond & Share Co. and later chief engineer of International Combustion Ltd. of England. In these positions he was responsible for the design of many steam generating plants in this country and in the British Empire.

♦ ♦ ♦

Charles H. Rese, formerly associated with the Detroit office of Otis Steel Co., has been transferred to Cleveland as district sales manager of the division there.

R. E. Lawlor, associated with Youngstown Sheet & Tube Co. since

1919, succeeds Paul B. Allen as district sales manager of the Otis Detroit division. Mr. Allen recently was named general manager of sales for Otis.

♦ ♦ ♦

L. Douglas Smith has been elected vice president of the Lewis Foundry & Machine Co., Coraopolis, Pa., succeeding Jan. R. Dunsford.

♦ ♦ ♦

Arthur C. Mundle, formerly assistant to the president of the United States Steel Products Co., New York, has been named vice president.

♦ ♦ ♦

Col. William R. Dunlap, former city supplies director in Pittsburgh, has been appointed public relations director for the Carnegie Steel Co., Pittsburgh, succeeding the late William H. French.

♦ ♦ ♦

B. F. Stein, Chicago attorney, has been made president of the Pines Winterfront Co., Chicago, manufacturer of automotive accessories, succeeding William L. O'Neill, resigned.

♦ ♦ ♦

Keith Williams, vice president and general manager of Pratt & Letchworth Inc., Buffalo, has been elected a director of the Buffalo chamber of commerce for a three-year term.

♦ ♦ ♦

T. J. Brady, formerly associated with the Accurate Tool Co., Detroit, is now with the mechanical goods division of United States Rubber Products Inc., New York, handling sales of grinding wheels in the Detroit district. At one time production superintendent for Wilson Foundry & Machine Co., Pontiac, Mich., and later research engineer at Willys-Overland Co., Toledo, O., for the past ten years he has designed and sold special production machinery for the Accurate Tool Co.

Died:

A J. TOWNSEND, 46, until his recent retirement vice president and general manager of the Rotary Electric Steel Co. (Michigan), Detroit, in that city, June 1. Born in Apollo, Pa., he was a graduate of Ohio State university and University of Toronto. Long associated with the steel industry, he first served in an executive capacity in 1917 as third vice president and works manager of the National Pressed Steel Co., Massillon, O., which was acquired by the Central Steel Co. in 1921.

In 1921, with H. M. Naugle, Mr. Townsend organized the Columbia Steel Co., Elyria, O., for the manufacture of cold-rolled strip steel. At this plant he worked out many new ideas, such as the continuous annealing furnace, continuous pickling equipment, the chute system for conveying coiled strip and other mill equipment. The Columbia company was merged with the Forged Steel Wheel Co., Butler, Pa., in 1926 and contracts were let for a broad strip mill. Completion of this mill provided the impetus for production of the only distinctive commodity—stripsheets—developed by the steel industry in 41 years. Mr. Townsend resigned in 1927.

In 1933 he supervised the construction of the Rotary Electric Steel plant in Detroit, which was centered around another distinctive product—circular blooms produced in a rotor device from steel scrap melted in the electric furnace. He resigned Sept. 1, 1934, due to ill health.

♦ ♦ ♦

Charles Horewitz, president and treasurer of Butler Iron & Steel Co., Butler, Pa., in that city, June 3.

♦ ♦ ♦

Beauregard A. Evans, director of National Casket Co., Pittsburgh, in Owensboro, Ky., June 3.

♦ ♦ ♦

Clinton W. Richardson, 87, founder and owner of the Richardson Mfg. Co., Bath, N. Y., in Avoca, N. Y.

♦ ♦ ♦

William H. Smith, president and general manager of the Pioneer Alloy Products Co., Cleveland, in that city, June 3.

♦ ♦ ♦

J. Roy Andrews, 61, for 25 years a sales engineer with the Johns-Manville Corp. at Chicago, in Hinsdale, Ill., June 3.

♦ ♦ ♦

Frank S. Waters, 57, president of the Lyon Metal Products Co., Aurora, Ill., in that city, June 6. With his brother, he found the company in 1889.

♦ ♦ ♦

Charles W. Peterson, 72, head of the Standard Pattern Works, Rockford, Ill., for 15 years until his retirement in 1925, in Rockford, June 4.

♦ ♦ ♦

William G. McKenney, associated with the old W. G. McKenney & Co., Glenwood, Pa., early steel producer in the Pittsburh district, in Pittsburgh, May 30.

♦ ♦ ♦

Eric Johnson, 73, president Johnson Mfg. Co. and founder of the Seattle Machine Works, in Seattle, May 25. Born in Sweden, he had lived in this country for 40 years, and was active in the diesel engine and heavy steel equipment fields.

♦ ♦ ♦

Edward A. Colby, 78, electrochemist and inventor, who devised an electric induction furnace in 1887, in Maplewood, N. J., June 1. His early induction furnace, it is said, provided the principle which is the foundation of electric steel melting practice in this country. He retired in 1930 after 30 years as chief engineer and superintendent of the Baker Platinum Works, Newark, N. J. He retained the office of secretary, however, and was the company's consulting engineer at the time of his death.

♦ ♦ ♦

James H. Barr, 70, former president and chairman of the board of National Supply Co., Pittsburgh, in Oldfield Point, Long Island, N. Y., June 1. He resigned as president in 1924 to become chairman of the board, leaving the latter post in 1932.

♦ ♦ ♦

Frank F. Storms, 71, president of the Storms Drop Forging Co., Springfield, Mass., in that city, June 2. Born in Slatersville, R. I., he had been a resident of Springfield for 40 years, for many years engaged in the drop forging business.

♦ ♦ ♦

Walter A. Stoneham, 50, founder and president of the Federal Tool & Machine Co., Dayton, O., in that city, May 18. Born in Guelph, Ont., he organized the Dayton company in 1914, serving as head ever since. He was also president of the Stoneham Engineering Co.

Financial

LUDLUM STEEL CO., Watervliet, N. Y., has declared the regular quarterly dividend of $1.62½ per share on the preferred, payable July 1 to record of June 24.

EXTRA MAKES ACME RATE 62½c

Acme Steel Co., Chicago, has declared an extra dividend of 12½ cents a share, in addition to the regular quarterly dividend of 50 cents a share on the capital stock.

NEELY NUT TO REORGANIZE

Neely Nut & Bolt Co., Pittsburgh, has been granted federal permission to submit a reorganization plan to stockholders. Elmer Whitehill has been appointed permanent trustee on a $10,000 bond, action having been taken in compliance with the amended bankruptcy act.

TO HEAR PRESSED STEEL PLAN

Hearing has been set for June 29 by the federal court at Pittsburgh on a petition to reorganize the financial structure of Pressed Steel Car Co. Bond holders' protective committee filed the petition May 29.

¶McKeesport Tin Plate Co., McKeesport, Pa., has declared a regular quarterly $1 per common share dividend payable July 1 to June 13 record.

¶Management of the Walworth Co., Boston, has been retained to conduct affairs of the company pending reorganization.

Activities of Steel Users and Makers

OHIO SEAMLESS TUBE CO., Shelby, O., has appointed Joseph T. Ryerson & Sons Inc., Jersey City, Philadelphia and Boston, its exclusive sales representative in Atlantic states for its special seamless mechanical tubing. Stocks will be carried at Jersey City and Philadelphia.

♦ ♦ ♦

Bay City Electric Steel Castings Co., Bay City, Mich., has passed to the sole ownership of E. M. Mills, one of the founders. He has purchased the interest of Samuel S. Fair, formerly president, and assumes that office himself. Wesley Ceeley of the Simons Iron & Steel Co., Lansing, Mich., becomes vice president and L. M. Mills secretary.

♦ ♦ ♦

Link-Belt Co., shovel and crane division, Chicago, has appointed Construction Equipment Co., 2274 Main street, Hartford, Conn., distributor of its crawler-mounted shovels, cranes, draglines and track-type locomotive cranes. George L. Kaeser is president.

♦ ♦ ♦

Lamac Process Co., 1253 West Twelfth street, Erie, Pa., has been reorganized with the following officers: President, D. A. Currie; vice president, L. L. Colcord; secretary, D. W. McDonald; treasurer, C. D. Pinney. The company manufactures a complete line of equipment and accessories for resoling shoes by cementing.

♦ ♦ ♦

Brown Instrument Co., Philadelphia, manufacturer of instruments and controls, and Minneapolis-Honeywell Regulator Co., Minneapolis, manufacturer of control systems and regulators, have opened a joint office at 101 Marietta street, Atlanta, Ga., room 303, to serve the Southwest. Wesley R. Moore, district manager for Brown Instrument Co., is in charge, with Leon L. Keumpel sales engineer, Charles A. Kitzinger service engineer and J. A. Crawley office manager. Minneapolis-Honeywell stock will be carried and complete sales and installation service maintained for both companes.

♦ ♦ ♦

Timken Steel & Tube Co., Canton, O., has appointed Edgcomb Steel Co., Philadelphia, agent for the complete Timken line of alloy and seamless tubes.

♦ ♦ ♦

H. A. Brassert & Co., engineer and contractor, 310 South Michigan avenue, Chicago, has received an order from the Tata Iron & Steel Co., Jamshedpur, India, for a set of Brassert high efficiency hot-blast stoves.

♦ ♦ ♦

Lauson Co., New Holstein, Wis., is being formed to take over the assets of John Lausen Mfg. Co., manufacturer of farm gasoline engines, tractors and power implements. Local and Milwaukee interests have bought these assets and reorganization is being carried on under direction of Henry S. Wright, industrial engineer, 721 North Water street, Milwaukee.

♦ ♦ ♦

St. Paul Hydraulic Hoist Co., St. Paul, manufacturer of hydraulic hoists and steel body equipment for trucks, has purchased the former plant of the Caterpillar Tractor Co. on University avenue, Minneapolis and will remove its business there. Fire in its St. Paul plant made the move desirable. Considerable new machinery and equipment will be installed in the new plant. The company is a subsidiary of the Gar-Wood Co., Detroit, and formerly was known as the Hydraulic Hoist Mfg. Co.

May Ingot Rate Down 3.8 Per Cent; 1935 Output Tops Same Five Months in 1934

PRODUCTION of steel ingots in May declined 3.8 per cent from April, the output being at the daily rate of 96,372 gross tons, compared with 100,243 gross tons in April, according to statistics of the American Iron and Steel institute. The rate of operation related to capacity was 43.53 per cent in May against 45.28 per cent in April. Total calculated production in May was 2,602,054 gross tons, compared with 2,606,311 tons in April, a loss of 4257 tons.

In comparison with May, 1934, the figures for last month show a decided loss, calculated production in May of last year being 3,352,788 gross tons, with a daily average of 124,177 tons and the average operating rate was 56.40.

Comparing five months of 1935 with the corresponding period of 1934 the current year shows a gain. The average daily rate for five months of 1935 is 104,942 tons, compared with 101,223 tons in 1934; calculated total production in 1935 is 13,615,360 gross tons and in the same period of 1934 it was 13,166,381 gross tons.

Monthly Production—Complete for Bessemer; Open Hearth, 99.32 per cent Calculated from Reports of Companies Making

	Open Hearth		Bessemer		Total		Calculated daily production, all companies (gross tons)	Number of working days
	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity		
1935								
Jan.	2,594,312	49.02	239,858	34.99	2,834,170	47.42	104,969	27
Feb.	2,517,789	53.53	224,336	36.82	2,742,125	51.61	114,255	24
Mar.	2,599,890	51.02	230,810	34.97	2,830,700	49.18	108,873	26
Apr.	2,374,395	46.59	231,916	35.14	2,606,311	45.28	100,243	26
May	2,347,258	44.36	254,796	37.17	2,602,054	45.33	96,372	27
5 mo.	12,433,641	48.90	1,181,716	35.82	13,615,360	47.76	104,942	130
1934								
Jan.	1,798,698	34.20	172,489	25.17	1,971,187	33.16	73,007	27
Feb.	2,007,287	42.93	175,873	28.87	2,183,160	41.31	90,965	24
Mar.	2,557,534	48.63	203,904	29.75	2,761,438	46.45	102,275	27
Apr.	2,640,326	54.22	257,482	40.57	2,897,808	52.64	115,912	25
May	3,021,168	57.44	331,620	48.38	3,352,788	56.40	124,177	27
5 mo.	1,225,013	47.48	1,141,368	34.55	13,166,381	45.87	101,223	130
June	2,733,571	53.97	282,592	42.81	3,016,163	52.68	116,006	26
July	1,352,932	27.73	119,869	18.89	1,472,801	26.76	58,912	25
Aug.	1,253,972	23.84	109,598	15.99	1,363,570	22.94	50,503	27
Sept.	1,134,127	23.29	117,580	18.53	1,251,707	22.74	50,068	25
Oct.	1,334,298	25.37	127,789	18.64	1,462,087	24.59	54,151	27
Nov.	1,457,206	28.77	132,059	20.01	1,589,265	27.76	61,126	26
Dec.	1,810,139	37.17	131,456	20.71	1,941,595	35.27	77,664	25
Total	23,101,258	38.13	2,162,311	27.39	25,263,569	36.89	81,233	311

Capacity percentages for 1935 are based upon open-hearth capacity of 60,954,717 tons and bessemer of 7,895,000 tons on Dec. 31, 1934; for 1934 based on open-hearth capacity of 60,583,813 tons and bessemer of 7,895,000 tons on Dec. 31, 1933

Washington's Reaction to The Demise of NRA

(*Continued from Page* 16)

to fix prices without benefit of the recovery act."

Last Friday the President made it clear that he has no authority to waive provisions of the Sherman law and indicated that no voluntary agreement of price maintenance can be made by industry if it violates the Sherman law.

Expiring codes mean also the expiration of all provisions of law in favor of voluntary codes, he pointed out. However, voluntary agreements can be made by industry as long as

they do not run counter to statutory law.

A great many things can be done, the President said, by industry voluntarily without violating the Sherman law. The President believes that foreign trade agreements are not unconstitutional under the code decision.

Discussing the fact that numerous industries are planning to continue their codes in operation without the sanction of law, the attorney general said that "this is one of the real difficulties confronting us."

Another matter that becomes wide open with the decease of NRA is the basing points. The trade commission is strongly on record that the present multiple basing system is merely an amplification of the old Pittsburgh-plus system against which it ruled in 1924. It regards multiple bases as a form of price fixing, and with the immunity from antitrust laws withdrawn, steel producers are now liable to action unless every producing point is made a basing point.

There appears to be no disposition on the part of the trade commission to be arbitrary or to move swiftly. But there is no doubt that a sword hangs over the head of steel producers.

From all sections of the country last week emanated announcement of adherence to code standards of wages, hours and ethics.

Directors of the Concrete Reinforcing Steel institute meeting in Chicago, Tuesday, passed a resolution recommending that the industry cooperate voluntarily "in preserving the principles and gains achieved in the code as regards labor relations, marketing and fair trade practices."

H. G. Batcheller, president, Ludlum Steel Co., Watervliet, N. Y., notified employes: "We have no intention of taking advantage of the abandonment of the NRA law to either reduce present wage rates or to change existing hours of work but on the contrary expect to continue present wages and hours of work just as long as competitive conditions permit us to do so."

MONTHLY IRON PRODUCTION

Gross Tons

	1935	1934	1933
Jan.	1,478,443	1,225,643	568,785
Feb.	1,614,905	1,270,792	553,067
Mar.	1,770,990	1,625,588	542,013
Apr.	1,671,556	1,736,217	623,606
May	1,735,577	2,057,471	892,326
Tot. 5 mo.	8,271,471	7,915,711	3,179,797
June		1,936,897	1,264,953
July		1,228,544	1,801,345
Aug.		1,060,187	1,833,265
Sept.		899,075	1,507,931
Oct.		951,353	1,358,540
Nov.		957,906	1,083,740
Dec.		1,028,006	1,192,136
Total		15,977,679	13,221,707

May Iron Output Up Slightly; Active Furnaces Drop to 96

PRODUCTION of coke pig iron in the United States in May increased slightly, but fell far short of recovering the ground lost in the recessions of the past two months. The average daily rate, it is to be observed, was nearly 16 per cent below the rate of May, a year ago, which, incidentally, was the best month of 1934. Active blast furnaces on the last day of the month totaled one less than at the close of April, this being the first curtailment recorded since last November.

Average daily production in May was 55,986 gross tons, which compared with the 55,719 tons of April, was a gain of 267 tons, or 0.48 per cent. The rate for March was 57,120 tons, and the rate for May, one year ago, 66,370 tons.

Total production amounted to 1,735,577 gross tons, an increase of 64,021 tons, or 3.8 per cent, over the 1,671,556 tons of April. Much of this improvement, however, was due to the fact that May was a one-day longer month than April. The output of May, 1934, was 2,057,471 tons.

For the five months of 1935, production has aggregated 8,271,471 tons, against 7,915,711 tons in the same period of 1934. This is an increase of 355,760 tons, or 4.5 per cent. The advantage which 1935 has held over 1934 is gradually being erased.

Relating production to capacity, May had an operating rate of 40.2 per cent, compared with 40.0 in April and 41.0 in March. The rate in May, one year ago, was 47.5 per cent.

Operating blast furnaces on May 31 totaled 96, compared with 97 on April 30 and March 31, and 96 on Feb. 28. In May, 1934, the total was 117, the highest point attained during that year.

During May, 6 furnaces resumed and 7 were blown out or banked. Of the steelworks or nonmerchant classification, 5 were blown in and 5 blown out; of the merchant classification, 1 was blown in and 2 were blown out.

Furnaces resuming in May were: In Pennsylvania: National No. 4, National Tube Co.; Cambria J, Bethlehem Steel Co. In Alabama: Fairfield No. 6, Tennessee Coal, Iron & Railroad Co.; Woodward No. 3, Woodward Iron Co. In Indiana: Gary No. 2, Illinois Steel Co. In Michigan: Detroit B, National Steel Corp.

Stacks blowing out or banking were: In Ohio: Jisco, Jackson Iron

AVERAGE DAILY PRODUCTION

Gross Tons

	1935	1934	1933	1932
Jan.	47,692	39,537	18,348	31,336
Feb.	57,675	45,385	19,752	33,122
Mar.	57,120	52,438	17,484	31,194
Apr.	55,719	57,873	20,786	28,524
May	55,986	66,370	28,784	25,282
June		64,563	42,165	20,867
July		39,630	58,108	18,394
Aug.		34,199	59,137	17,035
Sept.		29,969	50,264	19,788
Oct.		30,689	43,824	20,795
Nov.		31,930	36,124	20,858
Dec.		33,161	38,456	17,650
Ave.	54,778	43,774	36,223	23,699

MAY IRON PRODUCTION

	No. in blast last day of May	Apr.	Total tonnage Merchant	Nonmerchant
Ohio	23	25	73,537	387,835
Penna.	28	29	36,819*	417,720*
Alabama	10	8	54,871	79,136*
Illinois	8	8	36,690	133,407
New York	7	7	65,193	56,304*
Colorado	1	1		
Indiana	7	8	8,031*	260,241
Maryland	3	3		
Virginia	1	1		
Kentucky	1	1		
Mass.	0	0		
Tennessee	0	0		
Utah	1	1	2,664	123,129
West Va.	3	3		
Michigan	3	2		
Minnesota	0	0		
Missouri	0	0		
Total	96	97	277,805*	1,457,772*

*Includes ferro and spiegeleisen.

RATE OF OPERATION

(Relation of Production to Capacity)

	1935[1]	1934[2]	1933[3]	1932[4]
Jan.	34.2	28.3	13.3	22.1
Feb.	41.4	32.5	14.3	23.4
Mar.	41.0	37.5	12.7	22.0
Apr.	40.0	41.4	15.1	20.2
May	40.2	47.5	20.9	17.9
June		46.3	30.6	14.7
July		28.4	42.4	13.0
Aug.		24.5	42.8	12.0
Sept.		21.5	36.4	14.0
Oct.		22.1	31.8	14.7
Nov.		22.8	26.2	14.7
Dec.		23.7	27.9	12.5

[1]Based on capacity of 50,845,741 gross tons, Dec. 31, 1934; [2]capacity of 50,975,561 tons, Dec. 31, 1933; [3]capacity of 50,313,975 tons, Dec. 31, 1932; [4]capacity of 51,598,175 tons, Dec. 31, 1931. Capacities by American Iron and Steel institute.

& Steel Co.; Mingo No. 4, Carnegie Steel Co. In Pennsylvania: National No. 4, National Tube Co.; Aliquippa No. 1, Jones & Laughlin Steel Corp.; Shenango No. 1, Shenango Furnace Co. In Indiana: Gary No. 2, Illinois Steel Co.; Madeline No. 2, Inland Steel Co.

With announced dismantling of three blast furnaces during May, the number of potential units in the United States is reduced from 278 to 275.

United States Pipe & Foundry Co. is dismantling its Scottdale furnace at Scottdale, Pa. This stack, idle since 1925, was built in 1872-73; until Jan. 10, 1926, it was leased to the former McKinney Steel Co. It had an annual capacity of 120,000 tons of basic, malleable and foundry iron.

Work is starting in dismantling the Johnson City, Tenn., furnace of the Cranberry Furnace Co. This stack, first operated in 1899 and inactive for several years, had an annual capacity of 43,800 tons of low-phosphorus pig iron.

As announced in STEEL, May 20 (page 84), the Stewart furnace of the Stewart Furnace Co., Sharon, Pa., is now being torn down. This unit, built in 1872 and out of blast for some time, had an annual capacity of 110,000 tons of low-phosphorus and bessemer iron.

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Commodity	April 1935	March 1935	Jan. thru April 1935
Pig iron	8,247	2,708	23,729
Sponge iron	104	51	412
Ferromanganese, spiegeleisen (1)	5,563	2,800	13,742
Ferrochrome (2)	.....	1	1
Ferrosilicon (3)	80	60	441
Other ferroalloys (4)	.....	.....	1
Scrap	1,259	2,352	8,816
Steel ingots, blooms, etc.	348	56	970
Concrete bars	117	92	318
Hollow bar, drill steel	158	50	313
Merchant steel bars	1,407	1,442	6,663
Iron slabs	.....	.....	.....
Iron bars	53	39	269
Wire rods	1,094	1,881	4,702
Boiler and other plate	37	7	73
Sheets, skelp, saw plate	785	422	2,074
Tin plate	37	32	83
Structural shapes	2,228	1,719	9,401
Sheet piling	.....	.....	.....
Rails and fastenings	459	3	1,080
Cast iron pipe, fittings	.....	.....	.....
Malleable iron pipe fittings (5)	.....	9	46
Welded pipe	83	143	379
Other pipe	396	293	3,605
Cotton ties (5)	.....	177	269
Other hoops, bands	1,491	1,349	6,281
Barbed wire	1,813	3,364	9,078
Round iron, steel wire	339	330	1,308
Telegraph and telephone wire	3	4	7
Flat wire, strip steel	205	152	572
Wire rope and strand	189	204	699
Other wire	57	70	340
Nails, tacks, staples	2,211	1,339	5,509
Bolts, nuts, rivets	19	28	105
Horse and mule shoes	37	96	257
Castings and forgings	47	136	421
Total, gross tons	28,866	21,409	101,964

(1) Manganese content.
(2) Chrome content.
(3) Silicon content.
(4) Alloy content.
(5) New class. No comparable figures for 1934 and previous years.

April Exports Off; Imports Make Gain

EXPORTS of iron and steel products from the United States in April declined 117,699 gross tons, from 323,035 tons in March to 205,336 tons in April, a decline of 36.4 per cent. This is the lowest total of exports since April, 1934, when 201,539 tons were exported.

The March figure set a record for modern times and perhaps for all time, according to figures of the metals and minerals division of the department of commerce. In spite of this sharp dip from the unusually high March figure, total exports for April were about 4000 tons higher than in April, 1934.

A sharp contraction in exports of steel and iron scrap, which were 96,607 tons less than in March, accounted for most of this shrinkage, but exports of car wheels and axles, heavy rails, tin plate and taggers tin were also conspicuously smaller.

For first four months of 1935 exports rolled up a total of 1,019,648 gross tons, an increase of 28.8 per cent over the total for the same period of 1934. In this excess, steel and iron scrap played the leading role but other items also contributed, including semi-finished steel, black sheets, galvanized sheets, bars, car wheels and axles and shapes.

April imports totaled 28,866 gross tons, an increase of 34.9 per cent over the low aggregate imported in March. For four months of 1935 imports were 101,964 tons, about 10 per cent below the total for the same period of 1934.

In spite of the sharp shrinkage in scrap exports, this remained the heaviest item at 131,731 gross tons. Japan took most of this, 93,551 tons, with the United Kingdom second.

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	1935 Imports	1935 Exports	1934 Imports	1934 Exports
Jan.	22,784	262,740	22,653	178,023
Feb.	28,905	228,537	25,407	151,184
Mar.	21,409	323,035	38,393	261,269
April	28,866	205,336	26,862	201,539
4 mo.	101,964	1,019,648	113,292	792,015
May	.....	.....	29,465	241,753
June	.....	.....	24,848	219,406
July	.....	.....	17,676	233,186
Aug.	.....	.....	32,418	242,947
Sept.	.....	.....	23,847	301,330
Oct.	.....	.....	20,202	220,209
Nov.	.....	.....	35,272	299,263
Dec.	.....	.....	19,708	282,655
Total	.....	.....	316,761	2,832,764

ORIGIN OF APRIL IMPORTS

Gross Tons

	Pig iron	Manganese ore
Belgium	50	.....
Netherlands	3,281	.....
Norway	1,100	.....
Sweden	100	.....
United Kingdom	100	.....
Canada	2,330	98
British India	1,286	.....
Germany	.....	12
India	.....	16
Soviet Rusia in Europe	.....	7,259
Czechoslovakia	.....	2
Gold Coast	.....	3,050
Total	8,247	10,437

	Sheets, skelp and sawplates	Structural steel	Steel bars	Hoops and bands
United Kingdom	3	6	44	41
Belgium	472	1,760	728	748
Germany	297	339	129	500
Sweden	13	.....	316	.....
France	.....	123	187	202
Czechoslovakia	.....	.....	3	.....
Total	785	2,228	1,407	1,491

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Commodity	April 1935	March 1935	Jan. thru April 1935
Pig iron	74	137	756
Ferromanganese and spiegeleisen	1	29	33
Iron and steel scrap	131,731	228,338	691,419
Tin plate scrap	3,641	2,845	13,589
Waste-waste tin plate	1,839	1,784	7,614
Ingots, blooms, etc.	8,283	7,993	24,827
Bars, iron	90	80	437
Bars, steel	3,927	4,110	17,908
Bars, alloy steel	207	226	868
Wire rods	1,330	1,354	7,644
Boiler plate	56	74	317
Other plate, not fab.	3,031	3,487	12,248
Skelp, iron or steel	978	990	3,512
Iron sheets, galv.	95	263	513
Steel sheets, galv.	5,442	7,092	24,036
Steel sheets, black	8,471	6,706	34,296
Iron sheets, black	716	316	1,901
Strip steel, cold-rolled	1,286	2,225	6,101
Strip steel, hot-rolled	2,392	2,464	8,550
Tin plate, taggers tin	4,849	9,117	39,186
Terne plate	264	209	1,021
Tanks, except lined	258	604	2,137
Shapes, not fab.	2,723	3,100	9,696
Shapes, fabricated	1,892	1,307	5,840
Plates, fabricated	463	97	673
Metal lath	60	97	216
Frames, sashes and sheet piling	456	340	1,992
Rails, 50 lbs.	1,317	6,173	9,568
Rails, under 50 lbs.	219	548	787
Rail fastenings	455	454	1,693
Switches, frogs, crsgs.	81	74	435
Railroad spikes	265	225	953
Railroad bolts, nuts	24	55	161
Boiler tubes, seamless	1,048	680	2,827
Boiler tubes, welded	57	110	220
Casing and oil-line pipe, seamless	1,262	2,098	9,212
Casing and oil-line pipe, welded	139	792	3,392
Seamless blk. pipe, other than casing, etc.	342	257	1,381
Malleable iron screwed pipe fittings	301	304	1,058
Cast iron screwed pipe fittings	49	120	463
Cast iron pressure pipe, and fitgs. for	118	525	2,868
Cast iron soil pipe, and fittings for	263	546	1,483
Welded black steel pipe	2,050	2,268	7,426
Welded black wrought iron pipe	256	398	1,038
Welded galv. steel pipe	977	2,365	7,564
Welded galv. wrought iron pipe	98	151	337
Riveted iron or steel pipe and fittings	25	8	149
Plain iron or steel wire	1,062	1,138	5,058
Galvanized wire	1,616	2,332	6,202
Barbed wire	2,904	2,459	10,174
Woven wire fencing	181	163	570
Woven wire screen cloth	41	97	312
Wire rope	423	525	1,498
Other wire and mfrs.	497	590	1,758
Wire nails	938	1,270	3,539
Horseshoe nails	51	65	237
Tacks	26	44	133
Other nails, staples	194	226	890
Bolts, machine screws	566	665	2,243
Iron castings	924	672	3,009
Steel castings	229	368	944
Car wheels and axles	1,058	8,290	10,532
Horseshoes	42	2	66
Iron and steel forgings, n. e. s.	483	594	2,047
Total gross tons	205,336	323,035	1,019,648

EDITORIAL

Time To Experiment with A Metallurgy of Sugar

FOR all practical purposes the slate has been wiped clean in the field in which NRA has operated the past two years. Except that code equivalents in hours and wages will be required of government suppliers, from the standpoint of arbitrary controls the iron and steel industry reverts to its free pre-code status.

For nine and one half months, or until April 1, 1936, provided the President can be taken at his word and congress concurs, steel will have a clear field. The administration might have phrased it more graciously, but in short the industry must make good its claim that untrammelled it would recover quickly—or else!

This suggests that at once—and the period of grace is none too long—steel overhaul its relations with Washington.

No matter what private opinions may be concerning the administration, its personnel and its policies, it will continue to govern the country until January, 1937, at least. That being the case, pleasant relations are preferable to strained ones.

In the abstract, government is government, but in the concrete it is men—men with the same basic hopes and fears, responding to the same motives and attentions, desiring to be equally successful and noteworthy, as the average of men in private business.

Federal Officials Need Education in Technical Problems of Steel

A leading steel executive recently cited as one of the benefits of the NRA code the fact that he had come to know and like other executives. Let this lesson be applied to Washington. Suppose some of the outstanding men of the industry park their attorneys at home, go to Washington frequently, become acquainted with "key" men in the government, sit across the table and exchange viewpoints. It would work wonders.

Take the federal trade commission for example. On both sides there have been some unpleasantries, but let that pass. Apparently only through the commission can the advantages of fair trade practices be retained. The industry may not fully realize it, but the present multiple basing point system constitutes an unfair practice in the eyes of the commission, allegedly is a vehicle for price fixing, and hence is a potential source of conflict. The commission naturally is not susceptible to influence or palaver, but there can be no denying that invaluable benefit would accrue from an exchange of opinion and a sincere attempt to discover a common meeting ground.

No producer of steel would be so foolish as to alienate a customer, to ignore or talk harshly of him, and treat his representatives frigidly. Yet the government contains more potentialities for good or harm than any single customer. Steel should sell itself to Washington.

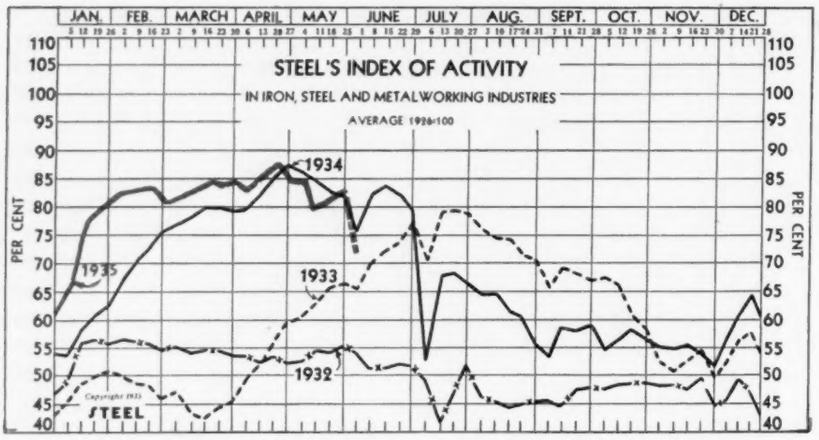
Granted, there are situations on which the industry must be alert. Organized labor will try to perpetuate its concept of collective bargaining, alias collective tyranny, through a revised Wagner bill. The President's confidence still is held by those who advocate a planned economy, and having been diverted from the commerce clause of the constitution they will likely try the taxing power route. From the White House doubtless will emanate other plans calculated to regiment industry. There is no minimizing dangers ahead.

Co-operation in Advance More Fruitful Than Flood of Protests Afterward

But after all, the best opposition is constructive effort. The way to parry any thrust of the trade commission at basing points is not to wait until after a suit has been filed, but to sit across the table and explain the convenience of the basing point method in facilitating trade. It is quite possible that some contacts with the department of labor and perhaps its co-operation in the set-up of employe representation plans would have averted many of the iniquities of the Wagner bill. A friendly word in advance weighs far more than a hundred telegrams and letters suspected of having originated as part of a campaign.

While the picture at Washington changes all too quickly, at the moment it is apparent that industry must make great strides toward recovery by the end of the first quarter of 1936. The first basic need, of course, is confidence—confidence on the part of investors and prospective consumers of iron and steel. No surer foundation for confidence has ever been laid than the unanimous decision of the Supreme Court in the Schechter case; property rights will be preserved. The second requirement is a working agreement with Washington, which will facilitate recovery by preventing, at least in part, the interposition of further obstacles predicated upon misconception or prejudice. The passing of NRA affords a peculiarly appropriate time for inaugurating an era of co-operation. Here is one new deal that the steel industry can profitably promote.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries declined 10.9 points to 71.9 in the week ending June 1:*

Week ending	1935	1934	1933	1932
Mar. 30	84.3	79.3	45.2	53.4
April 6	83.4	79.6	49.1	52.6
April 13	85.4	82.2	52.6	53.4
April 20	26.3	85.0	55.8	52.3
April 27	84.9	87.5	59.5	52.5
May 4	84.6	86.0	60.3	54.7
May 11	79.3	84.4	62.5	54.3
May 18	80.5	82.4	65.2	55.1
May 25	82.8†	81.9	66.1	54.2
June 1	71.9*	75.7	65.3	51.0

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL*). Average for 1926 equals 100, weighted as follows: Steel rate 40, and car loadings power output and auto assemblies each 20.*

Business Holds to Seasonal Trend Despite Obstacles

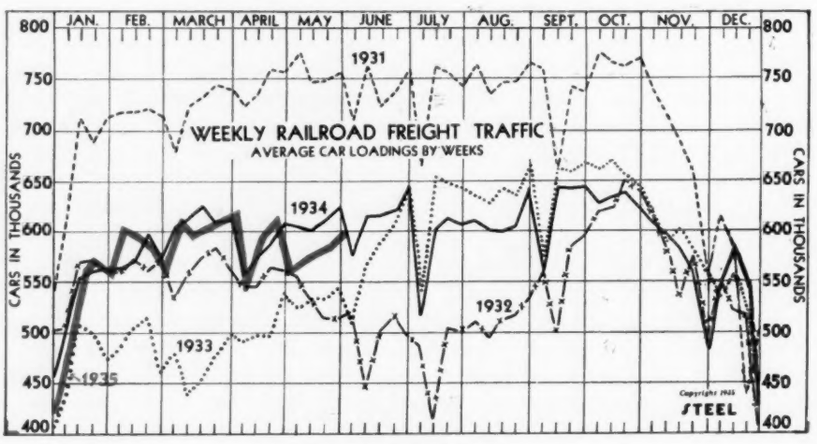
IN SPITE of the whirlwind of events that has confused the industrial picture the past two weeks, namely, the invalidation of NRA, the uncertainty surrounding commodity prices, a possible substitute for the blue eagle, not to mention the critical gold situation in France, business refuses to be stampeded and is charting the usual seasonal trend.

Most of the changes in the last week of May were downward, due largely to Memorial Day holiday. Automobile production in the week ending June 1 declined over 35,000 units to 65,675; while this shows a generally easier trend, it still tops last year's output for the corresponding week by over 11,000 units. Revenue freight car loadings declined slightly more than seasonal from the immediate preceding seven days. However, coal loadings will probably exceed a year ago due to some stocking up because of the unsettled labor conditions in the coal fields. Steelworks operations eased off to 42½, the lowest point since the first week of January. Electric power output continues its seasonal slide.

As the result of these movements, STEEL's index of industrial activity dropped from 82.8 to 71.9. This is the lowest point the index, which is not adjusted for seasonal variations, has declined this year with the exception of the first week in January, which also included a holiday.

Meanwhile, industrial activity is marking time, awaiting adjustments which inevitably will be necessitated by the important decisions handed down by the Supreme Court.

1935	
May 25	599,543
May 18	583,327
May 11	575,185
May 4	569,065
Apr. 27	558,886
Apr. 20	610,905
Apr. 13	587,685
Apr. 6	545,627
Mar. 30	617,485
Mar. 23	607,780
Mar. 16	597,432
Mar. 9	587,270
Mar. 2	604,642

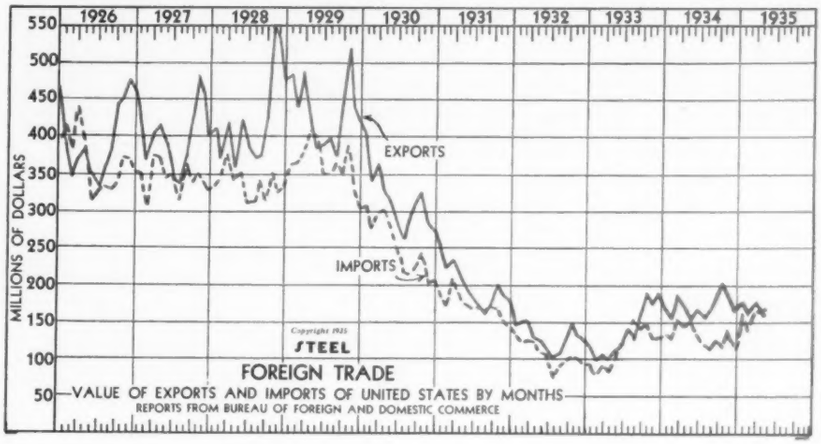


1934	
May 26	625,990
May 19	612,331
May 12	602,798
May 5	605,246
Apr. 28	609,704
Apr. 21	591,705
Apr. 14	579,981
Apr. 7	559,070
Mar. 31	610,190
Mar. 24	610,038
Mar. 17	627,549
Mar. 10	614,120
Mar. 3	605,717

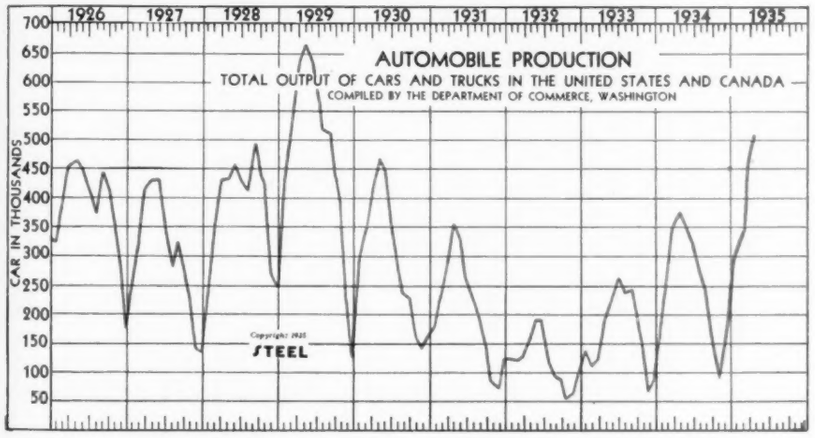
Merchandise Imports Exceeds Exports in April

Dollars (000 omitted)

	1935		1934	
	Exports	Imports	Exports	Imports
Jan.	176,223	166,993	169,531	128,536
Feb.	163,006	152,537	159,671	125,292
March	185,603	177,279	190,000	158,000
April	164,350	170,567	179,427	146,523
May	.....	.....	160,207	154,647
June	.....	.....	167,957	135,048
July	.....	.....	161,787	127,342
Aug.	.....	.....	171,965	119,516
Sept.	.....	.....	191,690	131,659
Oct.	.....	.....	203,622	137,859
Nov.	.....	.....	194,909	150,919
Dec.	.....	.....	170,676	132,252



Automobile Output Highest Since 1929

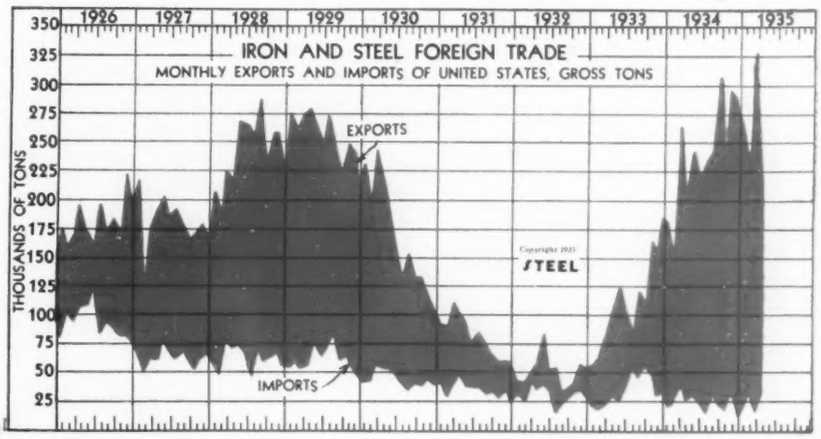


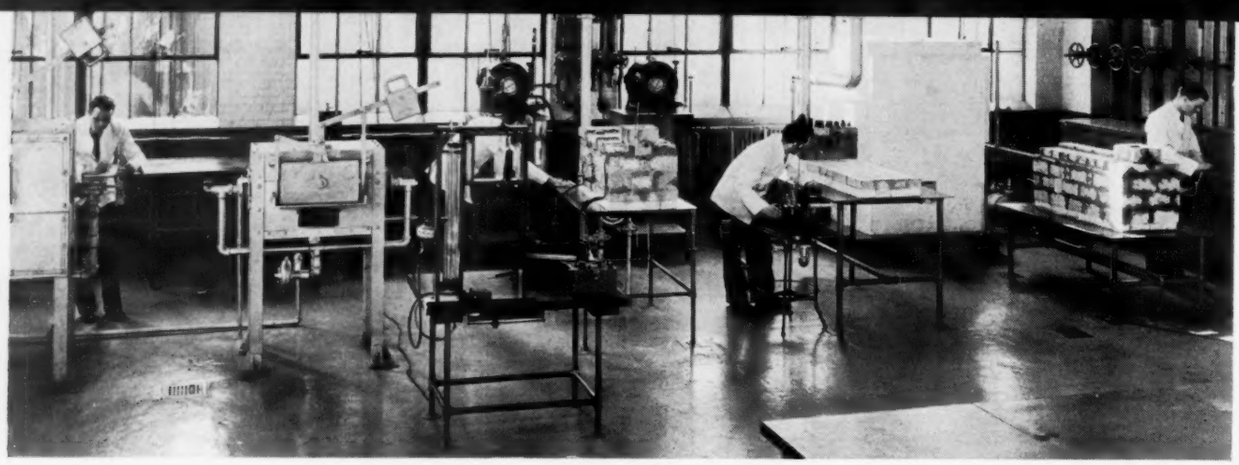
	1935	1934
January	303,372	162,570
February	358,658	238,827
March	451,809	352,614
April	501,837	371,338
May	.....	350,616
June	.....	320,382
July	.....	276,047
August	.....	244,715
September	.....	175,586
October	.....	135,771
November	.....	85,179
December	.....	156,356

Steel Exports Decline Sharply; Imports Rise

Gross Tons

	1935		1934	
	Imports	Exports	Imports	Exports
Jan.	22,784	262,740	22,653	178,023
Feb.	28,905	228,537	25,407	151,184
Mar.	21,409	323,035	38,393	261,260
April	28,866	205,336	26,862	201,539
May	.....	.....	29,465	241,753
June	.....	.....	24,848	219,406
July	.....	.....	17,676	233,186
Aug.	.....	.....	32,418	242,947
Sept.	.....	.....	23,847	301,330
Oct.	.....	.....	20,202	220,209
Nov.	.....	.....	35,272	299,263
Dec.	.....	.....	19,708	282,655
Total	.....	.....	316,761	2,832,764





Combustion research laboratory of the American Gas association where technicians study various types of gas combustion

Fundamental Combustion Data Trace Path to More Efficient Use of Industrial Gas

BY E. O. MATTOCKS
Industrial Engineer, Testing Laboratory, American Gas Association, Cleveland

ALTHOUGH knowledge of the fundamentals of combustion of most individual elementary gases has been well established, application of these known data to existing problems of complex gas mixtures has been extremely difficult and in some cases impossible due primarily to a lack of authoritative data. At the present time, with the increasing use of gas and the ever growing requirements for higher efficiencies and greater economies, it is essential to utilize all available knowledge on the manner of gas combustion.

To meet these demands for increased data, so that better gas furnaces can be constructed, the committee on industrial gas research of the American Gas association has been sponsoring, for the past five years, a series of investigations at the association's testing laboratory in Cleveland to determine many of the unknown factors affecting gas combustion. During this time much information has been obtained and has been published by the association in the form of bulletins.[1] Salient points of these studies will be given in this article.

In order to appreciate fully the significance of these new data it will be well to review briefly some of the previously known facts. The combustible constituents of city gases are usually hydrogen, carbon monoxide, methane, ethane, ethylene, benzene, butane, and propane. Accompanying these combustibles are small quantities of carbon dioxide, nitrogen, oxygen and water vapor. Seldom do all these constituents exist in any one city gas; a combination of some of them appears in every city gas, whether it is natural, manufactured, or mixtures of these gases. Therefore, to understand fully what goes on when gas burns, it is natural to look to the burning of these constituent gases for an explanation. While this preliminary procedure lends some assistance the final answer was obtained only after the performance of considerable research work.

Although the quantity and composition of the flue products resulting from the complete combustion of a known quantity of air and gas can be

[1] "Research in Fundamentals of Combustion Space Requirements in High Temperature Gas Furnaces."
"Research in the Effect of Operating Temperatures on the Combustion of Industrial Gas."
"Research in the Elimination of Noise in Industrial Gas Burners."
"A Study of the Characteristics of Burning Gas with Preheated Air."
Published by the American Gas association, 420 Lexington avenue, New York.

ascertained from the chemical reactions[2] of the individual constituents, the manner in which these reactions occur is not so well established. For example, we know that the products of complete combustion are carbon dioxide and water vapor, but we cannot say by just what steps these were formed from the constituent gases. Furthermore, we are not able to state exactly the procedure of the action at the present time although we have considerable evidence to support various theories.

The old idea that upon ignition a hydrocarbon gas, as encountered in city gases, breaks down into carbon and hydrogen and burns as such has been replaced with a fairly well established hydroxylation theory[3]. This states that the hydrocarbon gas is progresively oxidized through several stages to carbon dioxide and water vapor. This action assumes that the combustion process is not interfered with and that sufficient oxygen is present to permit the action to go on to completion. It is interesting to note that if this action is stopped before it is completed, aldehydes are formed of which the familiar formaldehyde is prominent. This will account, generally, for the peculiar odor noticed in the products of incomplete combustion. Likewise, it is a general truth that whenever an aldehyde is present, carbon monoxide also will be present as a product of the incompleted oxidation process.

Practical Application Difficult

Although much more could be said about some of the new basic theories governing the burning of these elementary gases, application of these data to practical problems of design still is difficult. Therefore, one of the first problems investigated at the testing laboratory was the determination of what occurs when a city gas is burned in high temperature industrial installations and what design limitations should be adhered to if economical and efficient operation is to be obtained.

Design and application of the atmospheric burner which employs the Bunsen principle is fairly well known. However, the various zones are present only when part of the air required for complete combustion, called primary air, is introduced into the gas stream prior to combustion. If none of the air or all of the air required for combustion is mixed with the gas before burning, entirely different conditions exist.

These three distinct conditions of burning are shown schematically in Fig. 1. The most familiar one, the Bunsen flame, is shown in the center, *B*. The unburned air and gas exist in zone 5. Actual burning of the primary air and gas occurs on the thin surface of the inner partly luminous cone, 6. Since only a portion of the air required for complete combustion is supplied as primary air, the unburned constituents are then burned in zone 7 as oxygen is obtained from surrounding air by infiltration. The products of complete combustion are sometimes visible in a zone outside the reaction area.

If, on the other hand, none of the required air is mixed with the gas prior to its passage through the burner, the familiar luminous or yellow flame is obtained as shown in Fig. 1, flame *A*. In this case, zone 1 is composed only of gas. Oxygen is obtained from the surrounding air which filters into the flame and combustion starts on the surface, 2, of the inner cone. At the base of the flame sufficient oxygen is generally present to burn the gas completely in zone 4. However, as only a small amount of air is available in the upper portion of the flame, partial combustion results, and remaining hydrocarbons are decomposed, producing a luminous region represented by zone 3. As additional air is obtained the unburned constituents are then burned completely in zone 4.

The combustion principle employed for a large number of industrial purposes differs still further from these two cases just cited. In such cases all the air required to obtain complete combustion is mixed with the gas prior to ignition. A flame depicting this condition is shown in the illustration as *C*. Here the mixture of gas and all the required air are shown as zone 8. From general appearances it is rather difficult to tell the difference between flame *B* and *C*. The major difference lies on the surface of the inner cone. In this latter case the combustion of the gas is completed on the surface of the inner cone or zone 9. Instead of having a reaction zone around this cone, as in the Bunsen flame, a mantel (zone 10) of incandescent products of combustion exists. After these gases have cooled sufficiently so that they are no longer visible, they have passed outside zone 10.

Effect of Dissociation

In order to describe fully the combustion of industrial gas, mention must be made of another rather complex action, that of the dissociation of carbon dioxide into carbon monoxide and oxygen and the dissociation of water vapor into hydrogen and oxygen. If the temperature of the gas is sufficiently high, this action will occur since both carbon dioxide and water vapor are present after combustion. It is doubtful if the flame temperature obtained by the yellow or Bunsen flame is high enough to cause dissociation. In the case of the third flame, however, the temperature is sufficient to dissociate some of the carbon dioxide and water vapor.

This action probably happens on or near the surface of the inner cone where the temperature is the highest. As these dissociated products pass into the cooler region (zone 10) the temperature is reduced so that the dissociated action reverses to a certain extent; the carbon monoxide combines with oxygen to form carbon dioxide, and hydrogen combines with oxygen to form water vapor. The luminosity of the gases in zone 10 may be caused partially by the burning of carbon monoxide and hydrogen

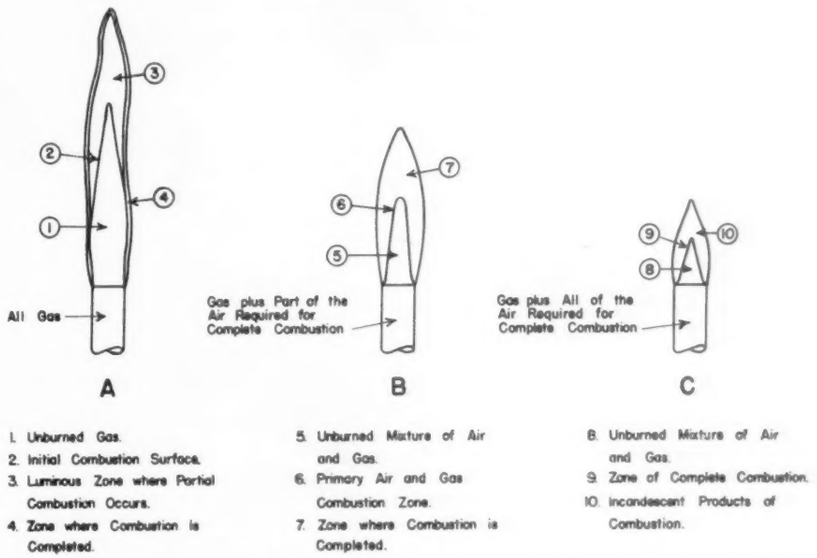

All Gas
Gas plus Part of the Air Required for Complete Combustion
Gas plus All of the Air Required for Complete Combustion
A
B
C
1. Unburned Gas.
2. Initial Combustion Surface.
3. Luminous Zone where Partial Combustion Occurs.
4. Zone where Combustion is Completed.
5. Unburned Mixture of Air and Gas.
6. Primary Air and Gas Combustion Zone.
7. Zone where Combustion is Completed.
8. Unburned Mixture of Air and Gas.
9. Zone of Complete Combustion.
10. Incandescent Products of Combustion.

Fig. 1—Schematic drawing of three types of gas flames, with different zones identified

[2]A good reference book for these reactions is the third edition of "Combustion," published by the American Gas association.

[3]For a complete discussion of this theory, reference should be made to "Flame and Combustion in Industrial Gases," by Bone and Townend, published by Longmans, Green & Co. Ltd.

during the reversal of this dissociation action.

In a large number of industrial installations, it is not desirable to have any reducing products present. If the dissociation of carbon dioxide and water vapor is allowed to occur at the flame temperature, some of the resulting carbon monoxide and hydrogen as well as nascent oxygen will exist in the flue gases even at low temperatures. In other words, the reversal of the dissociation action approaches completion but never actually reaches it. Therefore, if the undesirable effects of these products of dissociation are to be avoided, it will be necessary to repress dissociation. This can be done variously.

If a sufficient quantity of air in excess of that required to burn the gas completely is mixed with the gas prior to combustion, the dissociation action can be repressed completely and no products of dissociation will be formed in the flue products. The curve in Fig. 2 shows the quantity of excess air, expressed in per cent of excess oxygen as determined in a flue gas analysis, required at any given flue gas temperature to repress the quantity of carbon monoxide and hydrogen formed to 0.05 per cent. This residue value was selected as being practically a negligible amount and represented about the minimum amount that could be determined accurately. The relationship between excess oxygen and excess air in the flue products for both natural and coke oven gas is shown in Fig. 3.

Temperature Important Factor

In some installations, the flue products discharge directly from the flame onto a metallic surface such as experienced in pot furnaces. The gas temperature at this point is considerably higher than when it is discharged out the flue. Therefore, if all the carbon monoxide, hydrogen and nascent oxygen, formed as a result of dissociation, are to be eliminated so as to prolong the life of the pot, it will be necessary to admit excess oxygen corresponding to this high temperature. This amount is determined from the curve in Fig. 2.

Likewise, in the case of overfiring where some of the flue products may be circulated around the work before the gases have cooled to the furnace temperature, the amount of excess oxygen necessary to eliminate all the reducing products should be governed by the temperature of the gases at the outlet of these top burners instead of the furnace temperature.

The quantity of products formed from dissociation also may be reduced by preheating the air for combustion and by operating the furnace under pressure. However, no quantitative relationship for these two factors is available at this time.

From what has just been said about the manner in which gas burns, limits on the quantity of gas which can be burned completely can be established. For example, if all the air required for combustion is mixed with the gas, there appears to be no need for a combustion space larger than that necessary to house the flame. If enough excess air is admitted to the mixture to repress the dissociation of carbon dioxide and water vapor, the combustion chamber would have to encase only the inner cone. Of course, this enclosure should not touch the flame so as to interfere with the combustion action. During experimental work, gas was burned completely at the rate of 9,000,000 B.t.u. per cubic foot of combustion space with no indication greater quantities could not be burned completely. This is far in excess of that encountered in any of the typical industrial furnaces in use today.

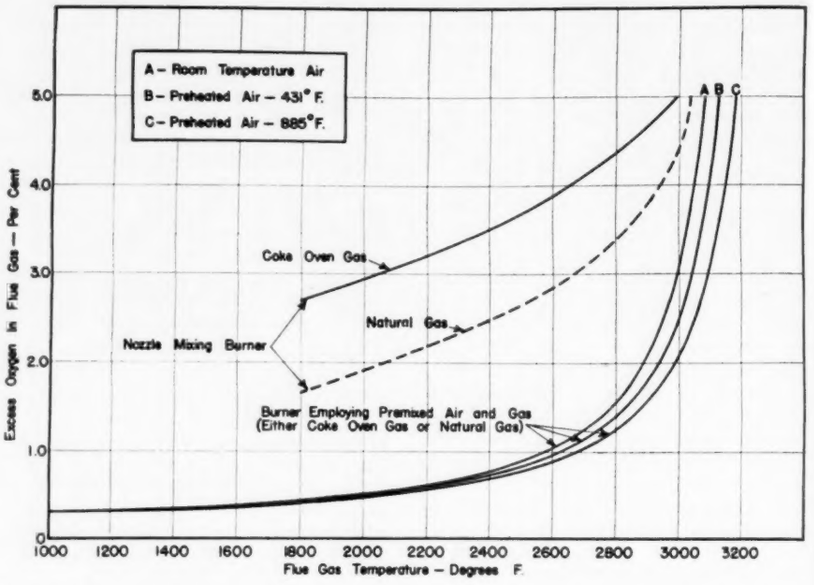


Fig. 2—Excess oxygen in flue gas necessary to obtain complete combustion with various combustion air temperatures, burners and fuel gases

Effect of Wall Temperature

Naturally the question arose as to the effect of the combustion chamber wall temperature on the quantity of gas burned completely, especially when consuming such large quantities of gas per cubic foot of comubustion space. To obtain as low a wall temperature as possible, a combustion chamber was constructed with water-walls. Unlike a boiler combustion chamber which this test furnace simulated, the outlet temperature of the water from this test furnace was not allowed to rise more than about 10 degrees Fahr. above room temperature. That the wall temperature would have no effect on the amount of gas completely burned was in direct accord with the theory of gas combustion as previously explained. In other words, as long as the combustion chamber walls do not contact the inner cone of the flame and thus interfere with the combustion reaction, the wall temperature could have no direct effect on the amount of gas burned when premixing all the air and gas.

In addition to the saving resulting from the utilization of preheated air, this action permits the burning of larger quantities of gas per unit of combustion space than does the burning of room temperature air and gas. This offers a method of increasing the capacity of a given combustion chamber without altering its general construction.

New Design Features

Having briefly discussed some of the fundamental findings of how gas burns, these data now will be applied to some actual everyday problems of industrial furnace design.

It is customary to design industrial furnaces with relatively large combustion chambers. Although this space doubtlessly has a definite value, it cannot be called rightfully a combustion chamber, but rather should be termed a "heat exchanger." The amount of space actually required to burn the gas completely is usually a small percentage of that provided. In view of this fact, the design of a furnace should consist of a combustion chamber and, if necessary, a "heat exchanger" and then the work chamber.

Fortunately, high flame temperatures can be obtained with gas flames. In most cases, however, these high temperatures are not desirable

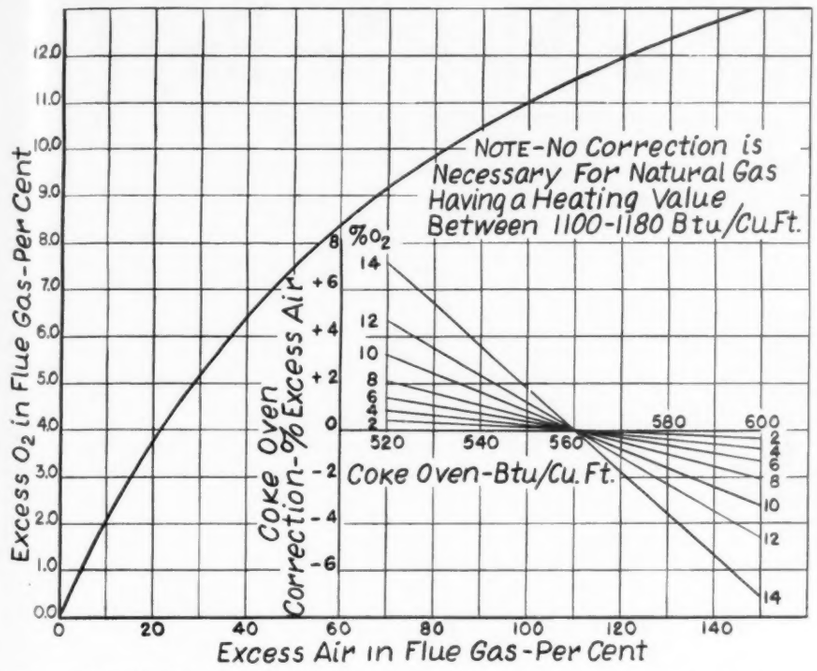

NOTE-No Correction is Necessary For Natural Gas Having a Heating Value Between 1100-1180 Btu/Cu.Ft.
Excess O_2 in Flue Gas-Per Cent
Excess Air in Flue Gas-Per Cent
Coke Oven Correction-% Excess Air
Coke Oven-Btu/Cu.Ft.
%O_2

Fig. 3—Relation between excess oxygen and excess air in flue gases for both coke oven and natural gases of various heating values

and it is necessary to reduce the resultant gas temperature before it is discharged into the work chamber. This reduction can be accomplished in any one of several manners. Generally, in direct firing, heat is imparted to the walls of the so-called combustion chamber and a large portion of this heat then transferred through the walls to the outside of the furnace, thus wasting a large amount of otherwise useful heat.

Changed to Radiant Energy

During the investigation of this project several means were determined for accomplishing this reduction in temperature with a corresponding saving in the amount of gas burned. Essentially, they involved changing the original excess heat at the high temperature to radiant energy and then utilizing that energy to heat the work, in addition to employing the usual convection methods.

A direct fired furnace should be constructed so that the combustion chamber is directly adjacent to the work chamber, that is, the work chamber wall should serve as part of the combustion chamber wall. In this manner, instead of dissipating the heat absorbed in the combustion chamber walls to the outside atmosphere, it can be radiated to the work. Likewise, the burners should be selected to convert the maximum amount of the liberated heat into radiant energy. By constructing the combustion chamber, for example, in a vertical position, one wall of which would be next to the heating chamber and the wall adjacent to the outside fully insulated, this chamber could be made sufficiently long to permit the temperature of the flue gases to be lowered to the desired level. Then the work would not only be heated by convection, but also by radiant heat from the hot combustion chamber walls along the side of the furnace. The flue openings could be placed in the hearth or on a level with it and the flue gases made to pass under the hearth before passing out the flue.

Burners Affect Performance

The selection of burners generally involves the type and number to be employed. Usually standard burners are chosen and as few employed as possible and still obtain good heat distribution. Greater consideration should be given this selection, for burners have considerable influence on the furnace performance. However, the most important requirements of a burner must be sought, since it is almost impossible to obtain a perfect burner.

To illustrate this, several important design details will be considered. In order to obtain the best heat distribution, the maximum transfer of heat from the flame to the combustion chamber wall, and the maximum input per unit of combustion space, the maximum number of burners possible should be employed. Offsetting these desirable factors is the increased cost as well as the increased noise occasioned by using a large number of small burners. The noise can be appreciably reduced by employing streamlined burners. However, a turbulent burner affords greater heat transmission and permits complete combustion of larger quantities of gas per cubic foot of combustion space.

In industrial furnaces, more and more demand is being made for exact control of the atmosphere surrounding the work being heated. In direct fired furnaces which employ completely premixed air and gas in which the burners are tightly sealed in the furnace, the complete absence of any carbon monoxide and hydrogen can be obtained by using the curve in Fig. 2 as a guide for determining the amount of excess oxygen necessary to secure this condition. It is possible to obtain a reducing condition of most any degree in the furnace by decreasing the quantity of air to the burners. Within economic limits it is possible to obtain most any atmosphere (oxidizing, neutral, or reducing) within a gas furnace. With the use of proper controls, this atmosphere can be maintained within close limits throughout all the range of inputs.

Nozzle-Mixing Burners

The operation of an industrial furnace is for the purpose of supplying heat to some type of material. This heat may be supplied in any one of a number of ways, each of which will possess certain advantages. These various methods generally require specific burners and furnace design. All previous discussion has pertained to burners which required the mixing of all the air for combustion with the gas prior to its admission to the burner. This particular type of burner and combustion is typical of the majority of industrial installations.

There is, however, another type of burner and combustion which is meeting increasing favor due to its particular characteristics. In this case, the air and gas are separately conducted to the combustion chamber and then discharged. The mixing of these two is performed after they leave the burners. Inasmuch as there are so many variations in design of this particular type burner, no attempt will be made to give specific design data. Some decided trends, however, have been established from tests on one particular type of nozzle-mixing burner. The results should be considered when employing this type of burner in industrial installations.

The description of the method of combustion of a diffusion flame or one in which none of the air required for

(*Please turn to Page* 64)

To Buy or Not To Buy?

TELL BERNA,
General Sales Manager,
National Acme Co., Cleveland,

SAYS:

CAN a representative and progressive metalworking establishment *afford not* to buy modern machine tools of today's design?

Because automatic screw machines generally are purchased for volume production of parts, replacement of older models results in great economies in a majority of cases due to the improvements that are incorporated in machines of today's design.

Recently a large manufacturer of automobile accessories replaced 39 automatic screw machines built 10 to 12 years ago with 16 new machines of the latest type. The 16 new machines are doing the work formerly done by 39 machines, which, in effect, means a production increase of more than 100 per cent per machine. This is one of many cases where the user, because of the flexibility and adaptability of the new machines, is making profits not possible with the older equipment.

Significance of Higher Speeds

While it may not be economically justifiable in all cases to make such replacements, the possibilities are such that no metalworking company can afford to ignore them. At the least, cost studies which will indicate clearly what can be accomplished with new as against old machines, are warranted at all plants where operations are on a volume production basis and where costs per piece are of vital importance.

In the case mentioned above, the savings are attributable to a number of factors, the principal one being the extensive use of antifriction bearings of various types which make it possible to operate automatic screw machines at hitherto unattainable speeds. As an instance of what has been done, spindle speeds have been doubled or trebled.

As a result, a new machine can reach down and do smaller work which could not previously be done on a machine of the same size. The spindle speeds of the new machines can be moved up on work of smaller diameters so as to maintain surface speeds within the full capacity of the cutting tools. This means a new machine designed for cutting work of larger diameters functions efficiently on smaller diameters.

Engineering Materials Improved

It is this increased flexibility which has permitted the manufacturer mentioned above, as well as many others, to do the same work with fewer machines. Roughly, spindle speeds of the new machines show an increase of 50 to 200 per cent as compared with the older machines.

Improved engineering materials play a big part in the flexibility and higher speeds of the new machines. With these materials it is possible to build greater rigidity into machines than hitherto possible. It is possible to make moving and reciprocating parts strong and wear resistant, and yet light in weight. Tougher gears are being made. Machine parts are being produced with greater accuracy, checked by more thorough inspection methods. These features result in a machine which produces better work and which tends to retain its initial accuracy during its effective life.

Advances in design have contrib-

". . . . . Cost studies which will indicate clearly what can be accomplished with new as against old machines are warranted at all plants where operations are on a volume production basis and where costs per piece are of vital importance," maintains Mr. Berna in viewing the economic justification for replacement of old machines. This is the second article of a series in which leaders in the machinery and equipment fields state their opinions on this timely subject. These discussions and others to follow will present a composite picture of the many advantages accruing from intelligent modernization of capital goods.

uted greatly to the progress in the automatic screw machine field. The new machines have a strong brace which binds the top of the frame together, not only increasing rigidity but affording a support for two more cross slides than were available on older models. Our new reel drive represents an improvement; by driving the stock reel independently, strain and backlash on the spindle carrier are avoided, reducing vibration and producing better finish on the work. On older models, centrifugal force tended to interfere with the satisfactory operation of the chucking fingers; the chucking fingers now are enclosed to make sure they function fully at high spindle speeds.

Another marked advantage in our new machines is that they are built in two different ratings, 4 and 6-spindle, all on identical frames. This feature results in lower patternmaking and production expense.

Another helpful design feature is the greater care exercised in providing aprons which effectually prevent the chips from getting into the ways and other moving joints and which prevent the washing away of the lubricating oil by the coolant.

Less Idle Time with New Tools

With the new machines there is less idle time. Parts are more accessible and set-up time reduced. Changes in cams are made more easily. Cutting tools are replaced with greater speed. It now is possible to obtain fine finish and accurate results with forming tools where shaving tools formerly had to be used. Because of the mounting of camshafts, machines can be controlled, or tools set, from either side of the machine.

A feature of great importance in the performance of automatic screw machines of latest design is the use of improved force-feed lubrication to bearings. The gears run in oil and there are better means for cleaning the oil and removing dirt and grit. In our machines we have a pump that starts and stops automatically with the machine. This is equipped with a sight-feed oiler for every bearing in the machine. Instead of trying to adjust the flow of oil with a needle valve with minute opening, which requires adjustment for temperature, we use a pulsating pressure so that five times a minute a drop of oil goes into each bearing.

Cooling Is More Efficient

Another factor which makes possible the production results obtainable with the new machines is that improved coolants are available, giving longer life to cutting tools and a better finish to the work; the flow of the coolant has been speeded up.

Because of the many new features such as indicated above, many secondary operations are eliminated. Greater accuracy built into the machines may eliminate grinding or reaming as secondary operations. Threading or tapping may be handled as automatic operations. Many operations such as slotting, cross milling and cross drilling, always considered as secondary operations, now can be done on the automatic.

Not the least of the features of the new automatic is that the operator need not take unusual care to avoid injury.

Fabrication of Road Machinery by the Electric Arc Welding Process

BY D. D. TRIMBLE

Superintendent, Welding Division, J. D. Adams Mfg. Co., Indianapolis

IN USING the arc welding process for effective fabrication of road machinery at the J. D. Adams Mfg. Co. two separate and distinct operations are involved—setup and tack welding, and final assembly welding the latter with shield arc electrodes. To take full advantage of arc welding with shielded arc electrode it is necessary to weld in the downward position, hence no attempt is made to use such electrodes in the tacking operation. Since vertical and overhead tacks cannot be eliminated, bare and light coated electrodes are used for tacking.

No more tack welds are made than are necessary for holding the assembly together. This is because of the well known fact that the physical properties of fusion metal produced with bare or light coated electrodes are rather low, including low tensile strength, low fatigue value and low resistance to corrosion. Too, extremely high thermal stresses are locked up in the areas adjacent to the weld.

Tack welding with bare or light coated electrodes requires an entirely different manipulative skill than that involved in working with shielded arc electrodes of much higher deposition efficiency. Hence, it is a rule to entrust tack welding entirely to men trained in such welding and skilled in assembly which requires correct interpretation of drawing. Thus, two radically different welding processes never are done in sequence by the same operator. Furthermore, it is a good policy to keep the same operators working on the same assemblies as far as possible, enabling them, through familiarity with procedure, to maintain a heavy production schedule.

Design of jigs and fixtures required in setup and tacking entails considerable ingenuity. They must be applicable to varying sizes of machines and susceptible to adaptation to changes in design. It is necessary that component members of the assembly can be put in place easily, and that the assembly can be quickly withdrawn from the fixture after being tack welded. The assemblies must be so designed that the final welded product will have the correct tolerances allowed for in the design of the machine; hence, it is part of the functioning of the designing department to set up correct welding procedure which will result in satisfactory welding without undue warpage or distortion.

Design of many road grader assemblies involves the use of both steel castings and hot-rolled steel, welded together. Such composite construction provides a satisfactory and economical solution for some of the more difficult design and fabrication problems. Component parts for some of the large road grader frames, for instance, are provided beforehand with machined surfaces or bearings, so that in assembling it is necessary to hold these parts in perfect alignment and still produce welds stronger than any of the component parts. Such intricately shaped parts are produced as steel castings which are welded to hot-rolled steel plates, shapes and bars.

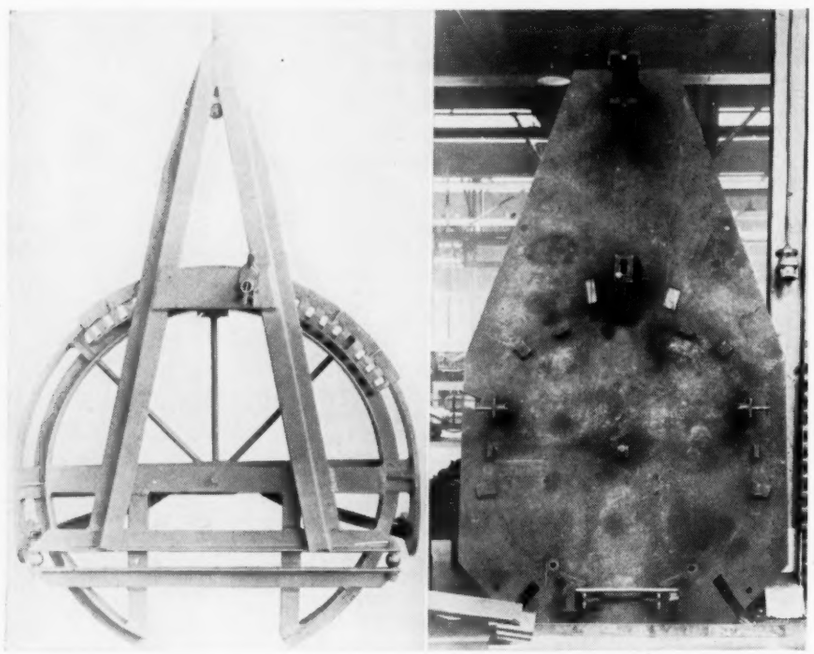


Fig. 1 (left)—Road grader drawbar assembly of castings and rolled steel, welded together. Fig. 2 (right)—Fixture on which the drawbar shown in Fig. 1 is assembled

Assembly Withstands Stress

Fig. 1 shows a composite structure of this kind, a drawbar for a road grader. The semicircle on this unit is formed from hot-rolled steel bars containing 0.45 to 0.55 per cent carbon, with cast steel gear segments and guides welded to the inside surface resting on the flange of the drawbar. This composite welded structure has been found to transmit safely and permanently a multitude of stresses of various kinds which develop constantly when the road grader is in operation.

The fixture used in assembly of this drawbar is shown in Fig. 2. For different sizes of drawbars different assembly fixtures are used. They are all similar in design. The base of this fixture is a ¾-inch plate 60 inches wide and 12 feet long. To insure against any warpage or binding caused by rough handling, stiffening members of heavy angles are welded on the bottom side. This also makes a base to rest on the floor. For locating the different parts use is made of locating pins, V blocks and pads, the method of locating the part de-

pending upon the part. If the part has been drilled before assembly, usually a removable pin is used. If the part has no holes in it a pad is used for location. In Fig. 2 are shown two removable locating pins, one vertical pin for locating the hole in the channel for the pin in Fig. 1, which holds the drawbar and semicircle assembly together. The balance of locating points on this fixture are locating pads welded to the plate.

Fixture Facilitates Welding

To enable one man, the welder, properly to position this drawbar for shielded arc welding a fixture has been designed as shown in Fig. 3 with a drawbar assembly mounted for welding. This is an easily designed fixture comprising a wide I-beam base spaced far enough apart and securely bolted to the floor to prevent it from tipping, a 6-inch channel welded on top of the I-beams and connecting them with two 1 x 3-inch bars welded in the center spaced 1 inch apart, supporting a plate upon which the drawbar rests. This plate is mounted on a pin joint and a half circular piece is attached at the bottom with holes drilled close to the outside edge and revolving between the two bars. This enables the operator to move this in any position he desires and to lock the fixture in the particular position by inserting a pin into a hole drilled in the bar and matching the holes drilled in the half circular plate. Stiffening members are attached, as may be seen, which prevent the assembly from tipping over.

Upon the support plate is welded a pin which fits into the hole mentioned in the above paragraph, describing the locating fixture. The entire drawbar assembly may be pivoted on this pin by the use of the chain hoist, which is shown in

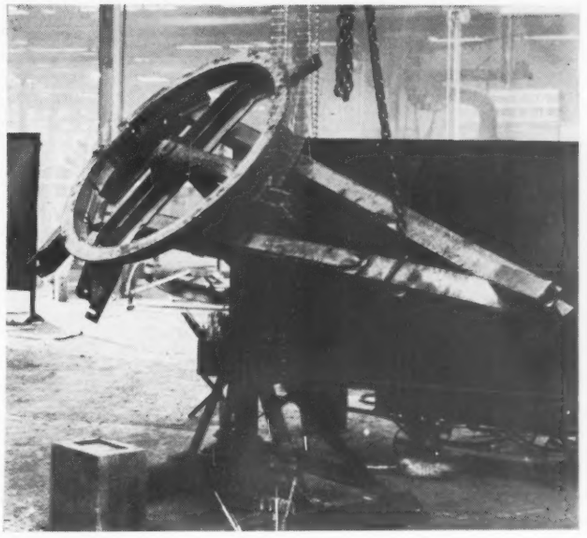


FIG. 3—Drawbar similar to the one shown in Fig. 1, mounted on positioning fixture for final arc welding operation

Fig. 3. Another type of fixture used in positioning various assemblies of road grader frames is shown in Fig. 4. This illustration also shows a road grader frame fabricated from heavy 8-inch channels, welded pipe for cross members, steel castings and the gear housings welded into place. The frames clearly show the necessity of correct welding procedure to maintain the proper alignment. This fixture has a heavy bed plate securely bolted to the floor with a 10-inch extra heavy pipe welded to the plate in the center which supports the entire assembly for moving and holding the frame.

At the top of the pipe is mounted a heavy ball and socket. The socket is mounted on pin joints with a gear rack welded on the bottom half. This rack meshes with a worm gear inside the pipe, turned by a crank on the outside. This enables the operator to move the entire assembly through an arc of 180 degrees. On top of the ball is a shank to which is attached the 2 x 3-inch bar which holds the entire assembly. This bar extends the full width of the frame and the side channel frame members are clamped securely to this bar by clamps which hold against the flanges of the channels. The entire assembly then can be shifted about by the welder, either by the use of a chain hoist or moving the crank to position the frame for the final welding operation.

Another feature of a positioning fixture of this type is that the height of it may be increased by cutting the pipe in half and welding on another piece of pipe, without disturbing the positioning mechanism.

Withstands Severe Treatment

Another type of road machine is the elevating road grader shown in Fig. 5. This frame is a completely welded structure and even the power control box from which the control levers extend is fabricated from steel and welded. One of the members subjected to terrific shocks, strains and stresses is the plow beam, which may be seen in the foreground extending almost the full length of the frame. The circular plow cuts into the dirt and rolls it upon the belt which elevates the dirt to the top of the carrier and then is carried away in wagons or trucks.

This machine is pulled by one or two 60-horsepower tractors and this circular plow strikes boulders, tree roots or other obstructions. The entire load is first carried by the plow beam which then transmits it to the frame but only then in a lesser degree, because the entire beam is swung at two points so that it may be raised or lowered. The plow beam is constructed of two 10-inch channels staggered with the flanges overlapping a fillet weld laid along each

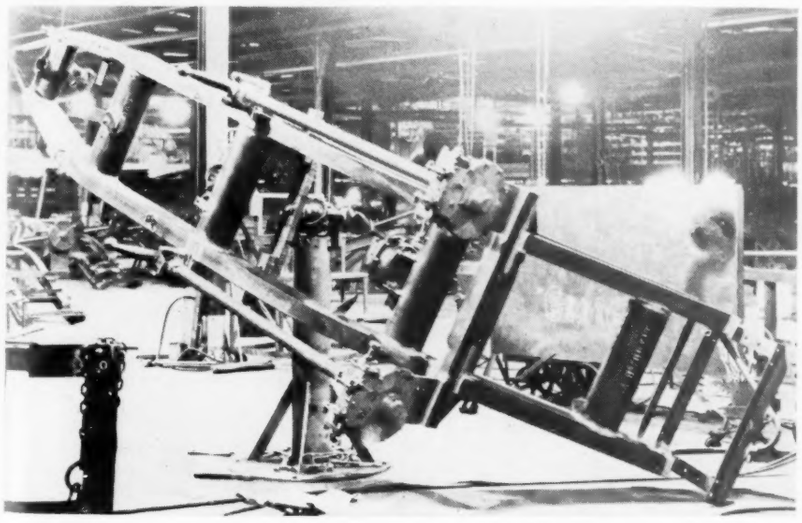


Fig. 4—Special type of fixture used in positioning and welding of road grader frame. A ball and socket joint at the top of the central support permits the assembly to be moved through an arc of 180 degrees

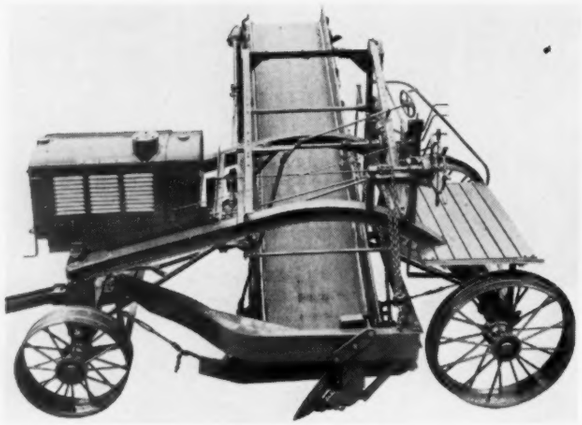


FIG. 5 — All welded elevating grader, many parts of which are subject to severe shocks in service

side joining the two channels into a homogeneous structure. At the center outside the channel is bent only at one place while the inside channel is bent at two places. The two channels are joined at this point by butt welding a $\frac{5}{8}$-inch plate between the inside edges of the flanges of the channels. This gives a strong box section at the point where the maximum stress is to be carried. Weight of this plow beam assembly is approximately 1500 pounds.

Fig. 6 shows the assembly fixture for the frame of the elevating road grader. This fixture has a heavy H-beam base bolted to the floor. Cross members extend between these two H-beams to support the various parts to be assembled on the frame and also to stiffen the welding fixture. Two rectangular sections stand upright on each side of the fixture. These are made of angles with gussets welded in the corners. These uprights support the two frame members and are pivoted at the bottom so that these two pieces may be laid back to permit easy withdrawal of the frame.

In the foreground of Fig. 6 may be seen the two supports for holding the box section which is welded to the front cross member of the frame. In the background are the supports for the rear cross member of the frame. This support is mounted on a pin connection so that it may be tilted to any desired angle for supporting the rear cross member and properly aligning it with the frame members Although this fixture has been designed to locate the different members in their correct position particular attention has been paid to ease of removal of the entire assembly after the tack welding operation.

Another interesting feature of this road machine is the belt carrier upon which the belt travels for elevating the dirt. This entire assembly is fabricated in two sections with the side rails made of ¼ x 10-inch plates formed into a double S to give the desired stiffness and held together by tubular cross members. This assembly must be held in so perfect alignment that the rollers, upon which the belt rolls, mounted on ball bearings, must be free to roll when the assembly is complete.

Some of the fixtures for the assembly of these frames are bolted securely to the floor while others are mounted on rollers so they may be moved back and forth between aisles of shop. This arrangement permits the tack welded assemblies to be placed in different aisles of the shop for the final welding operation. It also permits the stacking of material closer to the assembly fixture and thus lowers the cost of handling.

Fixtures Are Bolted to Floor

A fixture of this type is shown in Fig. 7, which is the assembly fixture for the road grader frame shown in Fig. 4. It is difficult to describe a fixture of this type; suffice it to say that it is made up of angles, bars and channels of such size to make the 22-foot fixture rigid so that any bumping or jar caused by removal of a frame will not distort it. At different points are locating pads and adjustment screws to locate the different members in the proper position.

It is obvious welded assemblies of the different types mentioned above cannot be stress relieved or annealed without creating serious misalignment through distortion and warpage. One of the biggest problems in originally setting up an arc welding procedure was one of obtaining welds in which low residual or thermal stresses would be created in the

Fig. 6 (right)—Special fixture on which the frame of the elevating road grader is assembled. Upright sections are pivoted at the bottom so they may be laid back easily to permit withdrawal of the frame

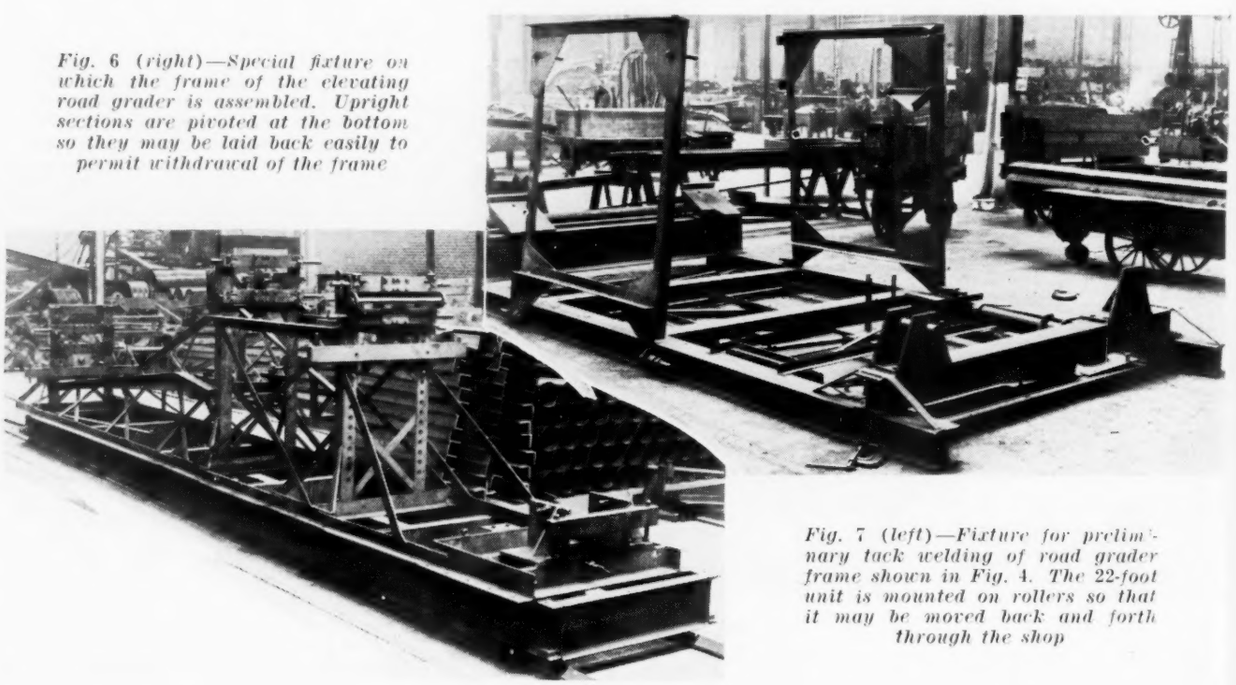


Fig. 7 (left)—Fixture for preliminary tack welding of road grader frame shown in Fig. 4. The 22-foot unit is mounted on rollers so that it may be moved back and forth through the shop

areas adjacent to the weld. The technique which has been developed keeps locked-up thermal stresses, even on heavy welds, down to an amount not over 5000 pounds per square inch, an amount which can be disregarded for all practical purposes.

To explain this technique or process clearly it might be well to recall that since the thermal conductivity of steel is much higher than that of the air, the heat energy from the superheated fusion metal is dissipated mainly into the parent material. Consequently, this will raise a considerable area of the parent metal adjacent to the molten fusion metal into the solid solution range and, therefore, will cause grain growth. This area is what is commonly known as the area of the locked-up thermal stresses or residual stresses caused by the secondary contraction of the parent metal.

Classification of Electrodes

For convenience the different types of electrodes for welding of low-carbon steels are classified into three main groups. One would contain the bare, dust coated and dipped coated electrodes, another would contain all of the gas shielded electrodes and the third group would contain all heavy slag shielded electrodes. Each of these groups will produce a different effect on the parent metal; that is, each group in the order mentioned will produce a lesser amount of locked-up residual stresses.

Why? In the first group the superheated fusion metal deposit freezes almost instantly because it is exposed to the chilling effect of the air. Characteristic is the dendritic structure of the fusion metal deposit, the coarse grain structure of the transition zone, the finer grain size of the parent metal where the welding heat had penetrated sufficiently to raise this area above the solid solution temperature, the Widmanstatten structure which is the carrier of the locked up residual stress, and last, the normal structure of the parent metal. Tests made by the use of the Olsen-DeShazer strain gage have shown locked-up residual stresses from 26,000 to 34,000 pounds per square inch.

In the second group, that of the gas shielded electrodes, we have the same areas but they are not as pronounced. The fusion metal, instead of having the dendritic structure, will show fine grains of pearlite and ferrite. The light slag deposited will lower the rate of cooling of the deposit and will cause more of the area adjacent to the weld to rise above the solid solution range. This will in turn promote more grain refinement and a lesser amount of the Widmanstatten structure. Tests made with electrodes of this type with the Olsen-DeShazer strain gage have shown locked-up residual stresses from 18,000 to 24,000 pounds per square inch.

Group three, containing the heavy slag shielded electrodes, will show almost a complete absence of some of these zones. First will be the characteristic ferrite and pearlite structure of the fusion metal showing a fine grain structure, then the junction between the parent metal and fusion metal, then a pronounced area of grain refinement of the parent metal caused by the heavy slag covering of the electrode, then a small area of the Widmanstatten structure which shows a slight tendency toward grain growth and finally the parent metal. Tests made with the Olsen-DeShazer strain gage on this type electrode have shown locked-up residual stresses varying from 2500 to 5000 pounds per square inch.

The heavy slag covering on this type of electrode will cause the molten fusion metal deposit to remain in a molten state from 45 to 60 seconds depending upon the size of electrode used, the carbon and manganese content of the parent metal, the current setting of the welding machine and the thickness of the parent meal.

Machine Control By Color System

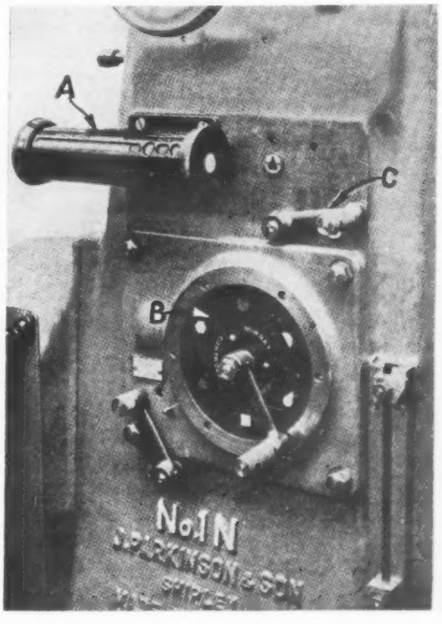
MACHINE control by color is the latest achievement in the simplification of equipment operation. At the British machine tool exposition in London last fall, machines were shown on which a color system was used to designate feeds, speeds and other details, supplanting confusing masses of figures and numbers hitherto employed. Color being a universal language, the system has proved effective on machines shipped to colonial territories.

An English mechanical engineer, Guy L. Murray, conceived the idea of using color control. Its early application was confined to gages colored in accordance with the work-check. Simplicity of the system and excellent results obtained in practice promoted its wider utility and it was adopted on certain machine tools.

Used on Milling Machines

According to a recent article in *The Automobile Engineer*, British publication, J. Parkinson & Co. Ltd., Shipley, England, has adapted the idea to some of its milling machines. Referring to the accompanying illustration, color control drum *A* replaces the original tabular plate with its 474 figures required for determining correct cutting speed, based on the diameter of the cutters. The end plate at the left of the drum is set to the cutter diameter, while the end plate at the right selects the correct color combination for any required cutting speed. To determine the spindle speeds the dial *B* which originally bore figures now is arranged with color symbols that coincide with the colors on drum *A*. When the operator manipulates the color control drum colors appear and each control wheel or handle is set to a corresponding color.

Since each color spot has a characteristic shape, incorrect operation by an operator who may be colorblind is prevented. Thus the machine is claimed to be entirely foolproof. World patents are reported to have been taken out on the idea.



COLOR control drum A guides the operator of this milling machine, replacing the former tabular plate with figures for cutting speeds. Color symbols on the dial B *determine spindle speeds*

Photo courtesy Woodmanse Mfg. Co., Freeport, Ill.

OIL-FIRED brooders of the type shown here are made largely of steel and cast iron and find wide use on poultry farms

LARGE USES OF STEEL IN SMALL WAYS

288th Article ◆ Oil Brooder Stoves

A RAPIDLY increasing use of steel finds its inception in the fact that adequate heating in unseasonable weather proves economically desirable in the poultry business. If the chicks are kept comfortable they develop into strong, healthy pullets and husky broilers at a much earlier age.

Oil stoves of special design are the units most generally used to meet such brooding requirements. Inasmuch as they are expected to last for years, the better oil brooders are built with great care. In the unit shown in the accompanying illustration, the oil tank is made of 26-gage, galvanized steel sheet and weighs 8 pounds. The drum of the stove is of 22-gage black steel sheet, covered either with graphite paint or enamel paint. All points in the tank and drum are folded and double seamed.

Other Materials Involved

The base is of cast iron which is supported on three legs made of ¾ x ¾-inch angle steel. Between the base and the drum is a guard made of No. 4 hardware screen which prevents the chicks from getting under the stove. A length of 5/16-inch copper tubing is used for conveying the oil from the tank to the stove.

The base of the stove is so dished that the radiant heat is directed under the canopy and the canopy is so shaped as to direct the heat over the brooding area. The canopy is made of 26-gage galvanized steel sheet, in seven sections. A float-type carbureter valve is employed for even regulation of temperature and the burner is provided with a draft regulator which prevents the flame from being extinguished in windy weather. The valve is provided with sediment traps and strainers which prevent working parts from becoming clogged with dirt.

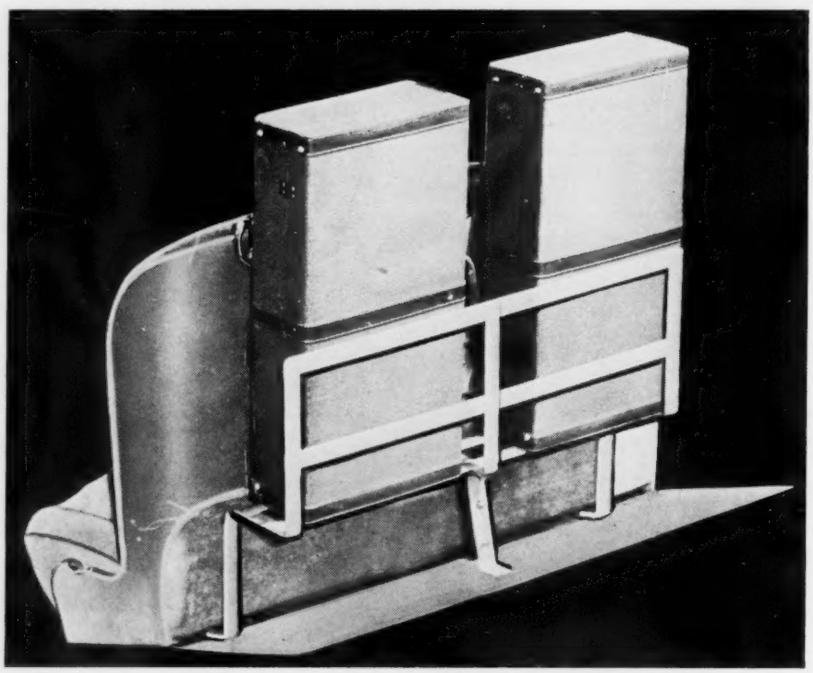
Complete weight of the brooder shown in the accompanying illustration is 76 pounds. It is made in sizes to accommodate 300 to 1000 chicks.

Prepares Catalog Covering Brass, Bronze, Iron Alloys

A useful and attractive reference catalog of brass, bronze and iron alloys which it manufactures for engineering purposes has been prepared by the Cramp Brass & Iron Foundries Co., Paschall station, Philadelphia. Made up in loose-leaf form with 8 x 11-inch pages, the catalog is not intended to cover the nonferrous and ferrous alloys in their entirety, but rather to present data applying to those alloys which are in constant demand and which constitute the basis of the variations that have resulted to suit individual requirements.

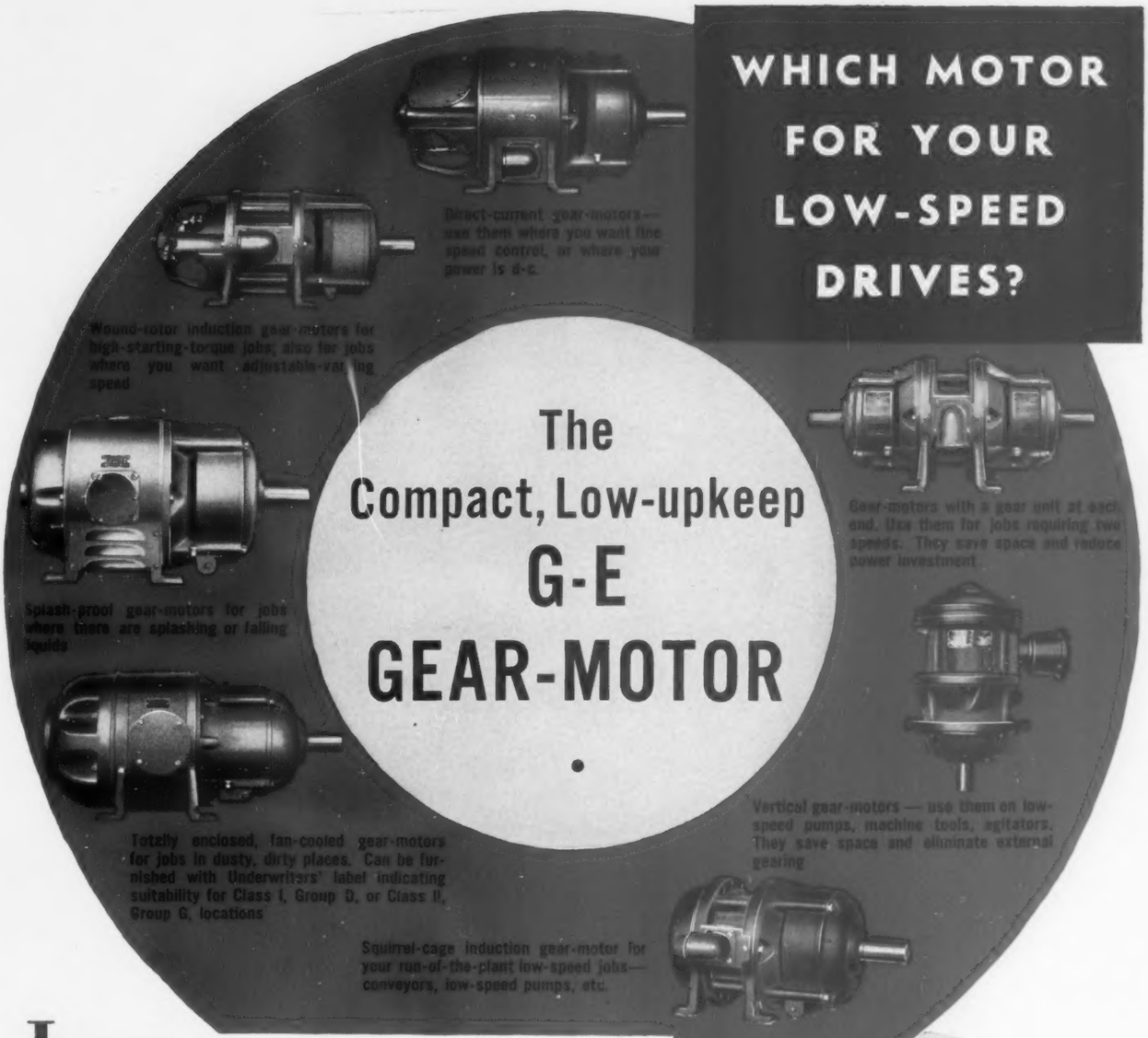
The booklet briefly describes the company's foundry facilities, lists the types of castings which can be made, then presents specifications for a wide range of alloys. Illustrations consist of views of castings made from these alloys. Concluding pages give acid corrosion data.

Handy Steel Accessory



NEW LUGGAGE CARRIER, manufactured by Watts-Morehouse Mfg. Corp., Jackson, Mich., fits against back of rear seat in sedans and coaches and affords means of carrying suit-cases, golf bags and other packages without interfering with foot room. It is held securely in place by the leverage action of a center floor support and two supporting arms which slide under the front seat. Vertical members are formed from 5/16 x 1¼-inch, half oval, hot rolled steel. Cross bars are of 5/32 x 1¼-inch half ovals with exception of top bar which is of ⅛ x 1¼-inch flat stock with round edges. Following application of a baking primer the carrier is finished with baked synthetic enamel in taupe color to harmonize with upholstery

WHICH MOTOR FOR YOUR LOW-SPEED DRIVES?


Direct-current gear-motors—use them where you want fine speed control, or where your power is d-c.
Wound-rotor induction gear-motors for high-starting-torque jobs, also for jobs where you want adjustable-varying speed
Gear-motors with a gear unit at each end. Use them for jobs requiring two speeds. They save space and reduce power investment
The Compact, Low-upkeep G-E GEAR-MOTOR
Splash-proof gear-motors for jobs where there are splashing or falling liquids
Totally enclosed, fan-cooled gear-motors for jobs in dusty, dirty places. Can be furnished with Underwriters' label indicating suitability for Class I, Group D, or Class II, Group G, locations
Vertical gear-motors — use them on low-speed pumps, machine tools, agitators. They save space and eliminate external gearing
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INDUSTRIAL plants everywhere are cutting power and maintenance costs and saving space with these long-lived G-E gear-motors.

Only slightly larger than standard motors, these low-speed drives combine the economies of high-speed motors with those of internal, helical planetary speed reducers, in which three planet gears share the output load. This means long life for G-E gear-motors.

You can reduce power investments and power costs with G-E gear-motors because they deliver their full horsepower rating at the output shaft.

From our complete line of gear-motors, 1/6 to 75 hp., speeds from 11 to 600 rpm., it is easy to select the RIGHT gear-motor for your job. Write for our booklet GEA-1437B. General Electric, Schenectady, N. Y.

THE RIGHT MOTOR FOR EVERY JOB—
THE RIGHT CONTROL FOR EVERY MOTOR

020-136

GENERAL ELECTRIC

METHODS AND MATERIALS

Suggests Proper Methods for Cleaning And Painting in Dust Storm Areas

SOME timely and helpful hints on the proper cleaning and painting of exterior and interior surfaces subjected to dust storms have been advanced by Dr. C. D. Holley, chief chemist, Sherwin-Williams Co., Cleveland.

The dust in dust storm areas contains alkali, is very fine and as it sweeps along it has a tendency to pick up particles of carbon, humus, soot, industrial gases, combustion residues from gasoline, etc. In other words, it is not ordinary dust in any sense of the word. Therefore, when deposited on a surface like the exterior of a house, an automobile, a porch, or a floor or wall, it has a decided effect on that film. If allowed to remain on the surface, due to its "greasy" characteristics, it will be bad for the paint film, and will make a poor surface to paint over. Consequently, these surfaces should be washed just as soon as possible, and properly washed. Plain water or a hose stream fails to get at the real dirt and is not sufficient.

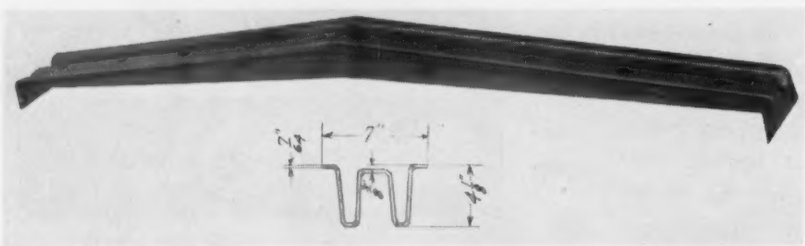
Harsh and gritty soaps or alkali preparations should be avoided as they are harmful to painted surfaces. Dr. Holley and his staff have found by a series of actual tests the best way to wash these surfaces, both exterior and interior, is to use a pure, soft, linseed oil or flax soap. Make a good suds in lukewarm water, use a brush or a sponge or cloth for washing the dirt off the surface, then rinse thoroughly with plain water.

Excellent results can be had from such washing where good quality paint has been used, preferably a good prepared paint of multipigment base; or where a good grade of paint or lacquer, or synthetic varnish or enamel has been used.

Cheap paints, and single pigment house paints or hand mixtures are more difficult to wash because their film does not have the gloss, is too chalky, and does not have the washable qualities to be found in the better grades of prepared paints. Therefore, in all dust storm areas, it is particularly important to use the best quality trademarked paints so that frequent washing with a pure linseed oil or flax soap can be given the surface, thus avoiding the necessity of too frequent repainting.

According to Dr. Holley, it is now possible to get house paint, floor varnish, automobile enamels and lacquers, wall finishes and woodwork and furniture enamels that give a highly washable finish, and these have practically replaced the old type, slower drying, nonwashable finishes.

Steel Carline for Box Cars



THIS NEW ROOF CARLINE FOR BOX CARS is cold formed from $\frac{7}{64}$-inch steel sheet. Its weight is 45 pounds. It is made by Parish Pressed Steel Co., Reading, Pa., in six operations. First the blank is stamped in a crank press, after which the keyslots are perforated. Then come three forming operations in a crank press. Finally, the rivet holes are perforated

\$ \$ \$

Develops Nonferrous Alloy With Special Properties

Nonferrous alloys possessing high wear resistance, extreme hardness, resistance to galling, high strength, and high resistance to corrosion at high temperature and pressure, and to dilute acids and alkalies, consist of 1.75 to 2.75 per cent silicon or 2.00 to 3.25 per cent silicon with the remainder composed of nickel and copper in equal ratios, according to a patent. Tensile strength from 90,000 to 125,000 pounds per square inch, elongation from 2 to 5 per cent, and brinell hardness from 250 to 325 are claimed for the alloys. For machining, the alloys are quenched from 1350 to 1600 degrees Fahr. in air, water or oil. Original hardness is regained by aging at 900 to 1200 degrees Fahr. for 8 hours.

\$ \$ \$

Large User Now Buys Repair Parts from Machine Builders

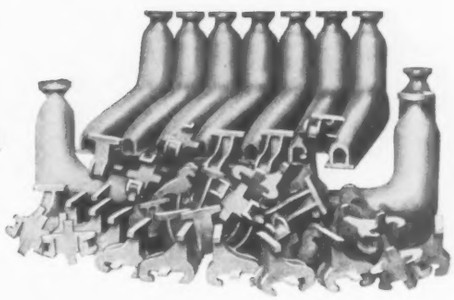
A large steel company has changed its policy with respect to repairing machine tools and similar equipment.

CHROMIUM *the key Metal*

FROM

SAND PUMPS

TO SMELTER



PARTS

for RESISTANCE to ABRASION

■ Chromium is the essential element for alloying with steel to obtain combined abrasion- and corrosion-resistance. It imparts resistance to shock, impact and fatigue. It is immune to the attack of many corrosive agents. It develops high creep strength and resistance to oxidation and scaling at elevated temperatures.

Steels containing from 25 to 30% chromium are used to combat abrasion coupled with corrosion. They also are effective in resisting wear and oxidation at elevated temperatures. As a result they are extensively employed in mine and smelter equipment.

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Where it had been making homemade repairs in order to provide additional man-hours for its own organization, it now is buying replacement parts from the original builder of the machine.

The change is due to embarrassments resulting from the former policy, some of which proved quite costly. In one case, a worn feed screw which originally was made of chromium-molybdenum steel was replaced in high carbon steel. This replacement was made three times, and slowly its form changed. The original screw was equipped with a key that was anchored in the gear by a dove-tail and had a shoulder to prevent end movement. In the third reproduction, this key had become a plain square key. It failed by sliding longitudinally under strain and chewed a deep recess in the machine casting and this so weakened the casting that it broke. The machine, which had a considerable amount of work ahead of it, had to be shut down for a week until it could be repaired with parts from the original maker.

S S S

New Bearing Metal Has Low Friction Coefficient

Increased demands of high-speed, high-compression motors have been met by the development of a cadmium base alloy hardened with nickel and known as Asarcoloy No. 7. Two motor builders have adopted this alloy as regular equipment. In addition to the many tests now in progress in the truck and passenger car field, the new material is being tested for steel mill roll neck bearings, turbine bearings, etc. It has a low coefficient of friction and shows a markedly low tendency to cause sludging of lubricating oil. Cadmium-nickel bonds directly with steel so that the same composition in use for the bearing proper may be used for bonding. No chemical compound is formed at the bond; the nickel penetrates the steel slightly. The new material is made by the American Smelting & Refining Co., New York.

S S S

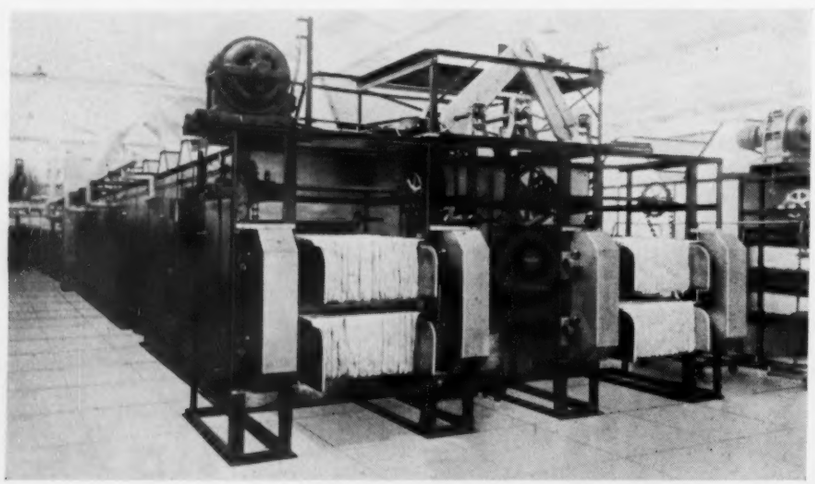
Machine Motors Should Not Be Too Powerful

Users should not demand overpowering of machine tools and other machines, says a Middle Western machine tool builder. Some of the present day machines, he says, are equipped with motors twice as powerful as needed, with a resulting bad power factor. The size of the motor, he declares, should not be larger than is required for the load.

Drying Machine, Formerly Constructed Of Steel, Now Built of Aluminum

BECAUSE corrosion and rust are accelerated by the hot, humid atmosphere necessarily prevailing in drying machines, the Philadelphia Drying Machinery Co., 3351 Stokley street, that city, has developed a dryer of aluminum construction. This step results from the company's experience with iron and steel construction; in some cases the corrosion shortened the life of the equipment while in others, used in drying of textiles and pharmaceuticals, rust impaired the quality of the product. The company reports that galvanizing of the structural members and the use of galvanized sheets proved only of temporary assistance and did not provide protection for any length of service. It was found impossible to galvanize some of the shapes after fabrication, while the bending and shaping of the galvanized steel frequently ruptured the zinc coatings and reduced their protective value. Rust proofing also was tried at various times but proved to have protective value only for short periods.

The first step in getting away from steel in the building of these drying machines was the use of aluminum heating coils, thus eliminating one large source of rust contamination and discoloration, as well as providing better heat transfer due to the high conductivity of aluminum. Structural aluminum shapes now are used throughout for the frame and the company reports the lightweight structure thus obtained is strong and rigid. Aluminum sheets are used for all internal partitions, as well as for the inside sheets of all insulating panels. Steam coils and coil supports are of aluminum. The frame is assembled by means of aluminum bolts. All surfaces coming in contact with the recirculated, heated and humid air are of aluminum or aluminum alloy. Care was used in selecting aluminum alloys free from copper, as the company found aluminum-copper alloys unsatisfactory.



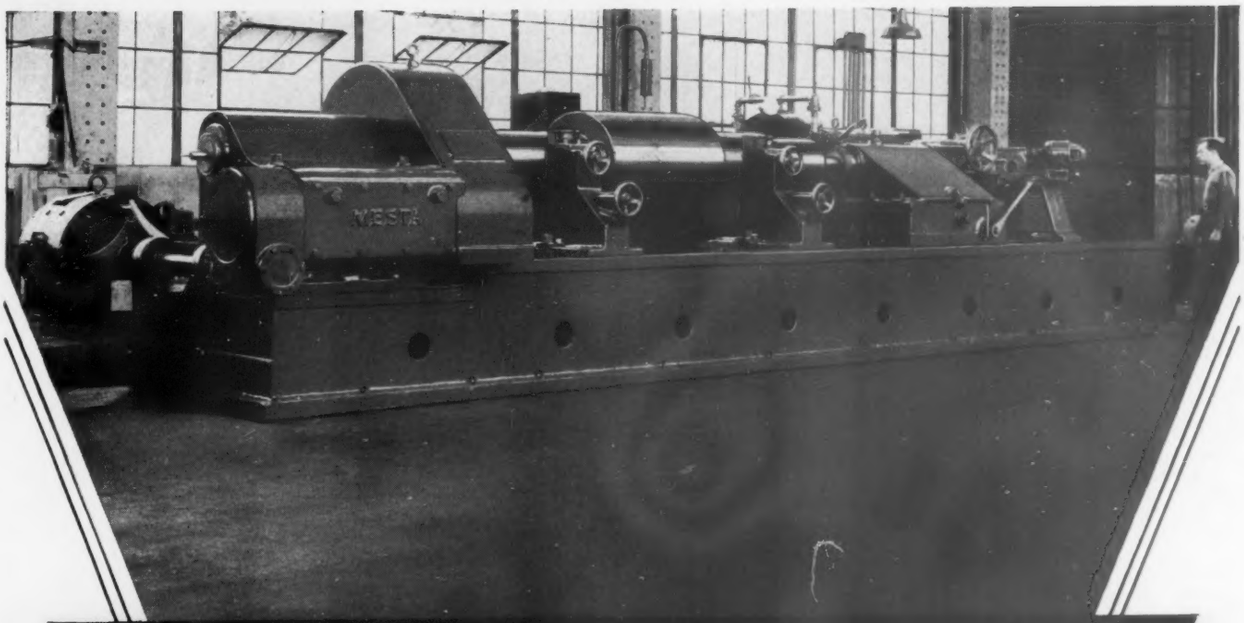
Formerly made of steel, this drying machine now is constructed of aluminum and aluminum alloys to prevent corrosion of machine parts and rust contamination and discoloration of the product

Grinding and Polishing Plow and Harrow Disks

Harrow disks which are made of high carbon steel usually are subjected to two abrasive operations to obtain a smooth surface. The first, usually termed surfacing, is performed to remove the scale preparatory to the polishing operation which is the second and final one. Surfacing ordinarily is performed with grinding wheels about 20 inches in diameter, 3-inch face, and 20 to 30 grit, hard grade.

In that operation, like in plow and other agricultural implement polishing a special fixture or cradle is employed to hold the work. The cradle which is made of wood consists of two arms joined so that they form a long V-shape similar to those on a hand cultivator or plow. The cradle is supported at the sharp end so that it may be swung in vertical or horizontal arcs under the grinding wheel, and it may or may not be counterbalanced.

In surfacing the harrow disks, they are held by a bolt through their centers so that they are free to turn on the cradle, and brought up to the wheel. Lines of travel as represented



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Crowning and concaving attachment an integral part of machine and guaranteed to produce any desired amount of crowning or concaving absolutely uniform and accurate.

Anti-friction bearings throughout.

MESTA MACHINE COMPANY
PITTSBURGH, PA.

by the two wheel edges bear on the circles of different diameters on the work, and cause the disk to rotate so that it is fed automatically under the wheel. By manipulating the arms of the cradle, the operator can surface the disk all over quite rapidly.

Polishing is performed in a similar manner, except that a canvas wheel set up with No. 36 aluminum oxide abrasive grain is used.

Improved Design Features New Range

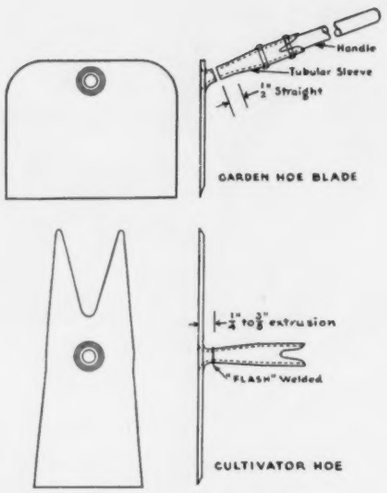
A NUMBER of interesting features are incorporated in gas ranges of improved design recently developed by the Cleveland Co-Operative Stove Co., Cleveland, and shown in the accompanying illustration. These new stoves are constructed of steel sheets, porcelain enameled inside and out, with exteriors in white, ivory, ivory with green pearl trim or ivory with golden pearl trim.

Cast iron burners are of a new non-clogging type and an automatic safety lighter ignites each burner when the valve is turned on. The cooking top and burners easily are removed for cleaning. A chromium plated steel reflector lamp illuminates the cooking top and salt and pepper shakers are conveniently located. The electric clock and measured time are convenient and accurate aids in preparing meals. The coverall operates easily on rollers, dropping in back of the stove during the cooking operation.

One of the special features is that an electric light, when the oven door is opened, automatically illuminates the oven interior. The oven has V shaped bottom and open liners permit the heat to rise rapidly into the oven; no preheating is necessary except when unusually high temperatures are required. An efficient oven heat control accurately measures the quantity of gas required for any baking or roasting operation. The entire range is insulated with blanket rockwool. Oven racks are of the non-tilting type, made of 9/32 and 5/32-inch steel wire, tinned.

It is unnecessary to reach into the hot broiling compartment to pull out the broiling pan, as the broiler rolls out, with the door serving as a shelf. The pan is of cast aluminum, in one piece, so that steaks and chops are seared and cooked on both sides at the same time; fats and meat juices drain into a well out of the heat zone so as to prevent burned odors and smoking. Because there are no slots or holes to require scrubbing, the pan is cleaned easily.

Storage space for utensils is provided in two large drawers which operate on glides. Handles are of exclusive design and may be supplied in white, ivory, red or green as desired. The legs are of new design; they are formed of heavy steel sheet, with porcelain enamel finish.



These drawings illustrate the flash welding method of producing hoes on a production basis. The blade is pierced and extruded to form a ferrule of the same diameter as the end of the tube to be welded to it, thus forming a socket for the handle

Flash Welding Applicable In Manufacture of Hoes

Production flash welding may be used to advantage in the manufacture of a large variety of products, states the Thomson-Gibb Electric Welding Co., Lynn, Mass., in its publication *Flashes*. Typical examples are the garden and cultivator hoes shown in the accompanying illustration. The process is fast and cheap and results in an implement of minimum weight without sacrificing strength. The tubular section may be attached at right angles or any other desired angle.

In this method the blade is pierced and extruded to form a ferrule ¼ to ⅜-inch long and of the same diameter as the tube end. When the ferrule and tube end are flash welded they make a single unit of the blade and handle. The welded joint is fully as strong as the parent metals. The handle can be formed of pipe, tube or sheet rolled into tubular form.

New steel gas range has illuminated oven, automatic ignition, measured time, one-piece, cast broiling pan and other features of practical value, all conforming to modern principles of design

Dilatometer Used To Gage Expansion of Metals

In the Schenectady works laboratory of the General Electric Co. is a dilatometer, an instrument which measures and records in ten-thousandths of an inch, the expansion and contraction of metals as they are heated and cooled. The device was built from specifications of the national bureau of standards for use of the company in its investigations regarding metals, and is not a device the company is marketing.

The dilatometer comprises a small cylindrical furnace surrounding a quartz tube—the quartz withstanding high temperatures and having a minimum of expansion when heated.

A round core of about the size of a thick pencil and made of the metal to be tested is placed within the tube, which is then electrically heated up to 1800 degrees Fahr. On top of the specimen is placed another smaller quartz tube sealed at both ends, to transmit the dilation of the specimen to a dial gage. The gage is connected by an Invar clamp to the outside quartz tube. and can be read to 0.0001-inch.

Metals do not expand in an even, gradual way as the temperature is increased, investigations have shown. Instead, they react in an irregular fashion, expanding in spurts. Often, when a certain temperature is reached, the metal under test will contract in spite of increased heat, and again expand at higher heat.

With the dilatometer such irregularities can be determined accurately. In welding, brazing or heat treating, information on the reaction of the metals involved to heating and cooling is valuable. In welding, for example, where one metal is being joined to a different one, the two should cool at approximately the same rate or be heated in a manner to compensate for difference in cooling rate. If one of the metals should cool faster than the other, it would shrink away from the weld and either crack or weaken the joint.

If it is known in advance, a variation in the rate of expansion or contraction can be taken into account by carefully controlling the temperatures of each metal. Complications arising from irregularities shown in the way certain metals respond to heat at critical or irregular points may also be avoided through proper heat adjustment.

Air Conditioning Cabinets Made of Steel Sheets

Buffalo Forge Co., Buffalo, has developed a new central air conditioning cabinet for uses in stores, offices, restaurants, etc. It may be furnished in combinations for simple cooling, or cleaning, or for complete air conditioning in summer and winter. Its operation may be automatic throughout if desired. The new unit is made with welded steel plate base which also serves as the drip pan. Casings are of galvanized steel sheets, removable in sections. Fans are die stamped of sheet steel and are equipped with graphite and bronze sleeve-type bearings which float on rubber insulators; the fan motor may be mounted either inside or outside the casing. Casings, fan housings and pan are painted with asphaltum. Cooling and heating coils are of the copper fin type. Humidifiers are of the coil and pan type for steam or hot water, and have float valve to maintain the water level. Filters are of the dry throw-away type and are readily removable.

WELDING, et cetera . . .

BY ROBERT E. KINKEAD

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

Charts and Explanations

A CLIENT of ours who redesigned a line of his machinery for welded construction also went the limit to get good appearance in line, form and color. Being a wise old bird, he says more machinery is bought because its appearance makes the buyer want it than is bought because of hair splitting arguments on efficiency by salesmen.

Many engineers are so afraid of being "arty" they will make a machine look like a piece of junk just to prove they have no frivolous thoughts. Nature does not work that way. Down wind from the blooming apple tree is a fragance that appeals to Mr. Bee. He follows it and finds an interesting flower. In collecting his burden of pollen, he pollenizes the blossom. Nature has accomplished her purpose by *attracting* the bee.

Good engineering includes sound artistic conception. Poor engineering and poor art needs a lot of charts and explanations to be appreciated. The merits of engineering based on nature's experience are self evident.

Story Hour from Pluto

(*Radio broadcast picked up from newly discovered planet*)

"And so," the story teller continued, "our Earth exploring party landed on the shores of the Nation of Soft Heads. Many villages, towns and cities were visited. The people were in great distress. About one person in six was being supported by government funds. The elders in all the communities complained the debts were so great the people could not pay the interest, to say nothing of the principal. Most of the factories were operating with small numbers of employes who were safd to be relatives of officials.

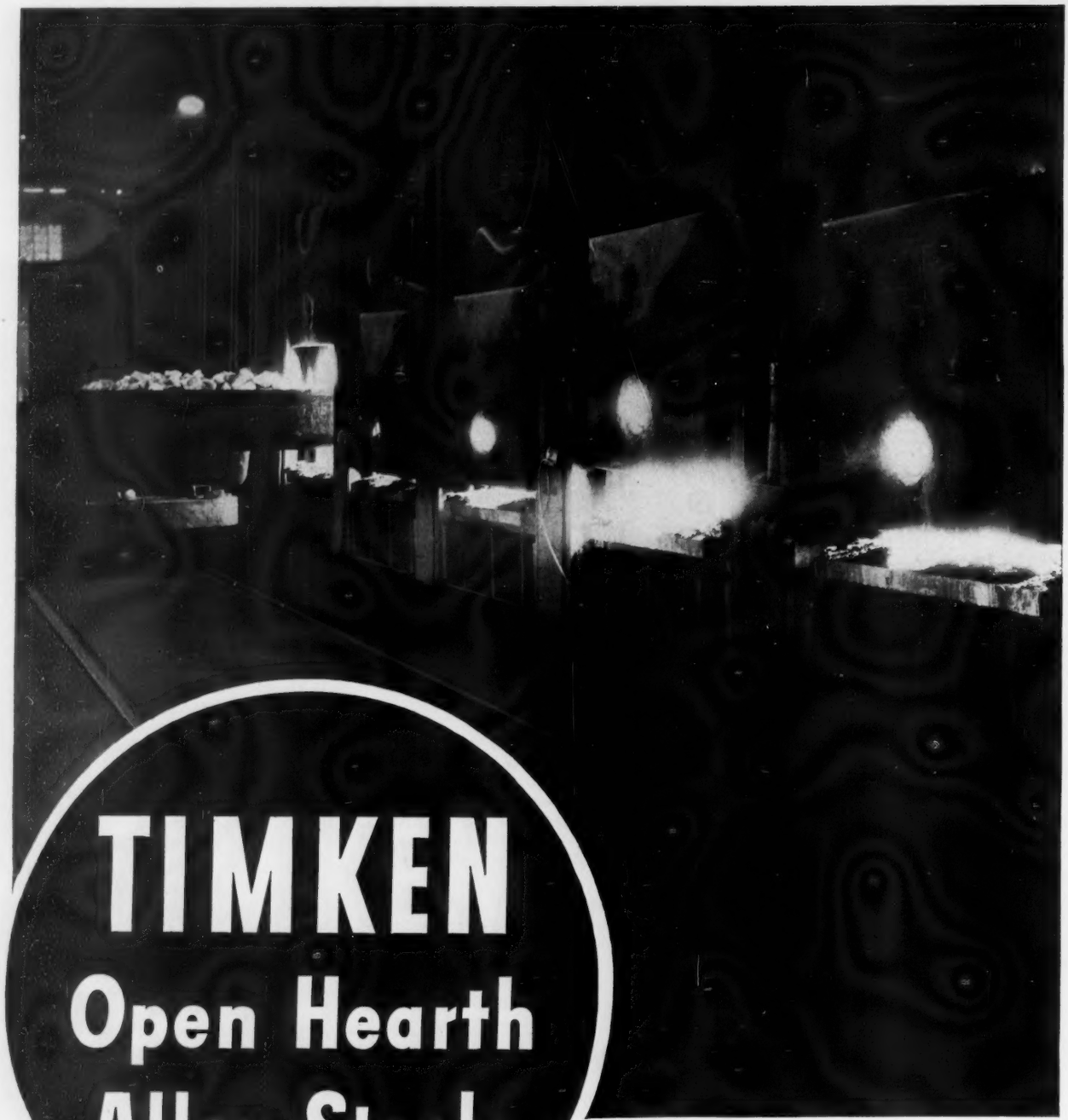
"At last, after hearing many sorrowful stories, our exploring party came to a beautiful city located on a river called the Potomac. Here everything was different. The women were fat; the animals well fed. There were no factories, no unemployment, no relief—everyone was happy. Every morning the people went to great marble palaces, of which there were many in the city. Early in the afternoon, the populace all retired to ceremonial rooms called cocktail bars, where festivals were celebrated until long after midnight.

"The leader of our party asked a group of the natives why their city was so prosperous and happy while other cities were in such distress. The scribe of the party copied down the answer given by the native so our economists at home hight learn the system. The native said:

" 'All the wise men in the nation live in our city now. We tell the farmers of the whole nation how to farm; the miners how to mine; the manufacturers how to manufacture; the merchants how to run their stores. Then we borrow so much money from the banks they are afraid to fight back for fear we will collect it from them in taxes. If any group or class gets too rambunctious, we just loan them a lot of money to shut them up. Then we borrow twice as much as we loaned them from the banks. We are in the money now and there is lots more where this came from.'

"And that boys and girls, is the end of our story today. In ten years our explorers will go back and see how it all worked out."

Enterprising welders find business in the farming country. Equipped with a light truck, an engine driven arc welder, gas torch and small tools, they drive through the country repairing anything from tractors to trinkets. Ten $1 jobs per day is $10, of which $6 may be profit. That is more profit than the combined net of the steel industry for last year.



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British Institute Meeting Features Welding Symposium

BY VINCENT DELPORT
European Manager, STEEL

A SYMPOSIUM on welding of iron and steel, occupying two days and divided into four sessions, drew special interest at the annual meeting of the British Iron and Steel institute held in London, May 1-3. Arranged at the suggestion of the British government, because welding had not been sufficiently studied, this symposium embraced about 150 papers contributed by 15 technical societies including several foreign societies.

These papers dealt mainly with three principal aspects: (1) The art of welding as it exists at present; (2) difficulties encountered in practice; (3) scientific work to solve these difficulties. Papers were divided into four groups: (1) Present-day practice and problems of welding in engineering industries; (2) welding practice and technique, including welding apparatus; (3) metallurgy of welding; (4) specification, inspection, testing and safety aspects of welding.

Papers Are Digested

The first group, presented by Dr. S. F. Dorey, Lloyd's Register of Shipping, was subdivided into two sub-groups, sub-group (a) covering bridge and structural engineering, pressure vessels, railway material and shipbuilding. Dr. Dorey, reviewing 40 papers and dealing first with shipbuilding, stated that the main object of welding was saving of weight and the facility of assembling. One author stated better welding is obtained by means of bare electrodes. Another, describing a welded barge, stated a saving of 10 per cent was effected in weight and 15 per cent in costs. One author stated that there is a sufficient variety of sections to choose from, but that advantages could be obtained by devising special sections. There is considerable scope for further investigations regarding relative merits of butt-welded joints over lap-welded joints; also as regards the relative value of welded stiffeners over riveted stiffeners.

With regard to structural engineering, one paper stated that big structures cannot yet be completely welded in Great Britain, because of cost. Another paper, dealing with bridges, stated all the sections can be supplied direct by the steel manufacturer without passing through the structural shop, the sections being cut by oxyacetylene and welded on the site.

Summarizing the papers on structural engineering, Dr. Dorey pointed out that there is room for a great deal of research on the properties of welded joints, especially where repeated stresses under heavy loads are concerned. Some thought should be given to devising an accurate fatigue testing machine, and the question of the corrosion of welded joints should be further investigated.

Under the heading of railway material, one paper dealt with end-to-end welding of rails by the resistance method, with a view to reducing the number of joints; this is particularly important on bridges, to avoid shocks when wheels hit the joints. It appears that flash welding, while not much used in Great Britain, is much employed in Germany. One paper, dealing with compression stresses due to expansion in welded rails 150 feet long, suggested that these stresses could be removed by laying the rails in hot weather or by artificial heating. One paper pointed out that some welded coaches showed a reduction in weight from 50 to 35 tons.

Pressure Vessel Fabrication

In the sub-group dealing with pressure vessels, a paper stressed the importance of heat treatment in boiler work and of X-ray examination for testing the joints. Modern tendency appears to be toward use of larger electrodes and greater amperage. As to welding for chemical plants, the process is not considered safe for containers sustaining pressures up to 4000 pounds per square inch. One paper emphasized the difficulty of correct heat-treatment in connection with the welding of high-tensile alloy steels. Welded gas holders are not much used in Great Britain, owing to conservatism on the part of gas companies.

J. L. Adam, a member of the Institution of Engineers and Shipbuilders in Scotland, stated an authoritative statement is wanted with regard to the reinforcement of stiffeners from the standpoint of economy in shipbuilding. On passenger ships it is required that the extremities of the ship have stiffeners 15 per cent of the length, because that is the requirement demanded from riveted structures; the speaker thought specification should be revised, and it might be possible to reduce the length of stiffeners in welding. He expressed the opinion that bare wire is not good enough for shipbuilding work. Another speaker said that a welded structure in England can be made at about the same cost as a riveted structure.

One speaker, referring to opposing statements concerning bare electrodes, warned that care is necessary in use of bare wire. Generally it is advantageous to use covered electrodes, because they are more easily controlled and they save labor; furthermore, the deposit is lighter. Bare wire welding is more liable to contraction cracking.

A. C. Vivian, comparing uses of bare wire and covered electrodes, said bare wire gives a brittle joint and will not carry stresses. Results are not the same with the gas-shield type of electrode and those that are covered with asbestos-type material; quicker results are obtained with the gas-shield type. Apparent favor of bare wire in Germany was believed due to lower stresses permitted.

Offers Welding Definition

Dr. W. H. Hatfield suggested that the ideal definition for welding would be: "Welding is the art of joining parts of the same metal in such a way that the structure obtained is homogeneous, continuous, the metal having the same properties and the same composition all through." This ideal is far from being approached in a large number of structures. A weld is obtained by means of a liquid metal which has a differential freezing, and in the final result there is generally not a homogeneous material. Residual stresses are not only due to thermal effect, but also to the manner in which the weld is applied.

Another speaker, dealing with large electrodes, said that with large electrodes, work can be performed which could not otherwise be done, but other difficulties come in, such as generation of greater heat, with possible greater—or perhaps smaller—residual stresses.

One speaker, referring to Dr. Hatfield's definition of welding, said that to attain the ideal would cost a considerable amount of money, owing to the necessity of elaborate tests. Dealing specially with the question of pressure vessels, he stated that for a medium-sized air receiver it is not necessary to reach 100 per cent perfection. He also questioned whether residual stresses in a welded joint were greater than local stresses in a riveted structure. Large electrodes will not fillet well on wrought iron and steel bridges, said another.

Sub-group (b) of group 1 covered

the aeronautical, automobile, chain, electrical, heavy engineering, and machinery manufacturing industries, iron and steel castings, and wrought iron. This group of papers was presented by Prof. B. P. Haigh, Royal Naval College, Greenwich. These papers again dealt with mild steel plate, but also with wrought iron, iron and steel castings, etc., and covered a greater diversity of aspects than the papers included in subgroup (a). Prof. Haigh pointed out that a number of papers dealt with repair work and the reclamation of defective castings; and that in repair work faults of design can be rectified. Two papers indicated that parts to be repaired should be heat treated, but he suggested that one should better know why such parts should have to be treated. Several authors recognized the importance of temperature control, but more scientific investigations still are required in this direction.

Weld Cracks Studied

Cracks in metal deposits were referred to in several papers. In this connection it must be realized that welded metal contracts, and in some cases becomes stressed up to the yield point. An Italian paper described the results in the arc welding fan wheels which have stood test for 10 years: this was of great interest, because tensile stresses are associated with vibrations.

Referring to marine work on ships, Prof. Haigh expressed the hope that more ships would carry their own reliable arc welding equipment. A number of papers dealt with automatic welding, and in those dealings with chain welding it was shown that chains up to 2 and 3 inches in diameter can be welded by the resistance process.

Dr. Gough, dealing with chains, said that for smaller sizes no other country could better British practice, but for the larger sizes, from ½-inch upward, these were almost all welded on the continent. Referring to a statement in a Czech paper that electrically-welded chains are better than wrought iron chains, Dr. Gough agreed that this was true, but that it was not certain that such electrically-welded chains could be regularly produced commercially.

V. G. Pearson, Edgar Allen & Co. Ltd., pointed out that more than 75 per cent of steel castings made in Great Britain are of weldable steel, and that, therefore, repair welding is no unusual process. Referring to the method of tracing cracks magnetically, he stated that this was all right in the laboratory, but that for large castings he polishes and etches the joints and takes a sulphur print.

J. A. Dorrat, Metropolitan-Vickers Electrical Co. Ltd., referring to turbine work, said that pressures now attained as much as 100,000 pounds per square inch at high temperature, and castings as received generally are not good enough and must be put into shape. A special electrode has been developed for repairing such castings; where a hole is made, this electrode is used to line the hole, and then an excellent mild-steel electrode is used to fill the hole. He added that he had successfully used the magnetic method of detecting cracks on such large castings.

T. A. Swindell, Dorman, Long & Co. Ltd., said that whenever he could defer the cooling rate, he had more chances of successful welding; in that connection he used bare wire, which did not give him the complication of having to deal with slag. Referring to warping of gear wheels, he stated that he got rid of that defect by not completely welding the rim until all the spokes had been welded.

Group 2 papers, dealing with welding practice and technique, including welding apparatus, was introduced by Dr. A. McCance, Glasgow. Dr. Hatfield, dealing with statements concerning the deleterious effect of nitrogen, said that investigations should be made to find a process which would avoid nitrogen being absorbed. He also pointed out that in a large number of cases, heat treatment after welding is not practicable.

R. Granjon, Institut de Soudure Autogene, France, said in France it is considered that different welding processes complement each other without actually competing. Each process can be used for some particular work. A speaker, referring to the dimension of electrodes, said he agreed that it is dimension that matters in spot welding, but shape does not matter.

Group 3 papers, dealing with the metallurgy of welding, were presented by Dr. T. Swinden, United Steel Companies Ltd. Main points of the discussion were taken up by Prof. A. Portevin, who stated that the metallurgy of welds is a very complex problem, in which metallography, or the study of structures, is of great assistance. Such factors intervene as the reaction between the steel and the surrounding atmosphere, and also the absorption of gases, especially oxygen and nitrogen. Study of the influence of oxygen is a very delicate problem; then there is the question of gases coming out of the metal, and the method used for calming the metal. He said that much study can still be made on the question of fluxes and coverings, and that this problem is somewhat similar to the study of slags. The thermal state of the metal should be studied both in time and space.

Service Tests Needed

A weld generally is heterogeneous, and this can be seen by small hardness tests and also by other special tests. There are laboratory tests and practical tests; laboratory tests have many advantages, but they do not represent actual conditions in use, therefore, considerable attention should be given to testing of welded structures without destroying them. So far, no test is completely satisfactory. He added, however, that minute test-pieces can be taken out of a welded structure for testing purposes, and the holes can then be filled.

Group 4 papers covered specification, inspection, testing and safety aspects of welding and was presented by Dr. H. J. Gough.

J. L. Adam, British Corporation Register of Shipping and Aircraft, said that the question of heat treatment still requires much investigation, but he thought that some form of heat treatment advisable. O. Bondy, London, suggested that fatigue tests should be developed to encourage users and designers to evolve new forms of welded joints. He also suggested international standards for welding symbols.

G. A. Hankins, National Physical Laboratory, said that a comparison of fluctuating stresses as between riveted and welded joints is required. It has been shown that riveted joints are stronger than welded joints as regards fluctuating stresses, and in some countries allowance is made for this in specifications.

SIR HAROLD C. H. CARPENTER, Imperial College of Science and Technology, London, was installed as the new president of the British Iron and Steel institute at the institute's anual meeting held in London, May 1-3. Sir Harold succeeded W. R. Lysaght, chairman, John Lysaght Ltd., Bristol, Somersetshire.

The Bessemer gold medal was presented to Prof. Albert M. Portevin, director, French Institute of Welding, professor at the Ecole Centrale des Arts et Manufactures, Paris, and at the Ecole Superieure de Fonderie, Paris, and past president of the French Society of Civil Engineers.

Riveting Auto Truck Frames

In connection with the article "Ingenious Methods Used in Riveting Auto Truck Frames," presented on page 51 of STEEL for June 3, credit should have been given the Chicago Pneumatic Tool Co., New York, for supplying illustrations and accompanying information.

Roebling — the custom-made wire for exacting welders

THIS fine welding wire is widely used by industrial plants, railroads, oil refineries, structural steel contractors, and others who require welding wire which meets exceptionally high uniformity requirements. Made by Roebling's special *custom* methods, it is absolutely uniform in quality and is free of non-metallic impurities. ¶ Available for either electric or gas welding, in a variety of straight lengths or in coils. Write for full information, prices or samples.

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IMPROVING OPEN-HEARTH FURNACE DESIGN

by William C. Buell Jr.

Chapter II — Part I

Slag Pockets

THE slag pockets are enlarged chambers in which the downtakes terminate. They are the anchors of the entire open-hearth furnace and system, the location of all other components being based from the slag pocket. Their purposes refer to the outgoing gases only and they have little or no effect on the incoming fuel gas or air which flow through them counter to the voiding furnace gases.

The volume of the furnace gases* is materially greater both at standard conditions and as a result of temperature than the combined volumes of air and fuel gas. Accordingly, all general discussion anent fluid flow through the slag pockets concerns the outgoing gases only, and if the flow of the furnace gases are sufficiently low in velocity to produce the effects sought, the volumes of the fluids flowing counter to the furnace gases will be inherently lower, thus encountering much less resistance to their passage.

The slag pockets receive the furnace gases which enter vertically through the top of the downtakes, the effluent gas temperature usually being 2800 to 3000 degrees Fahr. The voiding gases then turn through about 90 degrees to the horizontal and continue through the fantails to the regenerators.

The furnace gases flowing vertically in the downtakes contain miscellaneous matter that may be in molten or solid form. This matter may come from the fuel, the charge, the bath or the end refractories, and is substantial in both volume and weight. The quantity will vary considerably from the fuel used and its method of firing, the type of heat being made and other factors of operation, and the design of the furnace throats and ends.

Involves Two Types of Matter

In general, the entrained matter may be of two kinds, heavier material in larger particles that will be thrown out of the gas stream by its own momentum when the direction of the gases changes from the vertical to horizontal in the slag pockets and which comes to rest on the bottom of the slag pockets; and, lighter material in minute particles that may remain entrained in the gas stream, in spite of the right angle turn, and later be deposited in regenerators or flues, or voided through the stack.

As a related problem to that of open-hearth yields, C. D. King,[1] has investigated both the quantity and the composition of slag pocket and regenerator accumulations and certain of his findings are given in Tables XC and XCI. The latter is presented at this time in order that the total matter carried in the outgoing gases may be noted.

As combined from both tables the total weights of nongaseous material entering the slag pockets show about 18 pounds for producer gas firing, 22 to 28 pounds for tar operation, 7½ pounds and 6¾ pounds for coke oven and natural gas, respectively. King's producer gas results check closely with late figures from several other plants. Likely the extremely high entering velocity of the tar flame, with its great agitation, particularly during the melt down, causes the high carryover when this fuel or oil is used. The large volumes of the furnace gases and the consequent relatively high flow velocities likely are responsible for the considerable carry-over when firing producer gas, while the much lesser turbulent effects as well as the lower velocity of the smaller volumes of combustion products hold the carryover to a minimum when the richer gas fuels are fired.

Believing that throat design largely is responsible for the carryover to the slag pockets, the author recently redesigned the throats and slag

*A general term which includes the products of combustion and the gases evolved in the processing of the charge.

[1] Basic Open-Hearth Yields, by C. D. King, p. 197, Transactions, 1929, Iron and Steel division, American Institute of Mining and Metallurgical Engineers.

Table XC

Slag Pocket Accumulations, Quantity and Composition

	Producer Gas								
	West Gas	East Air	West Gas	East Air	Natural gas	Tar	Coke oven gas	Fuel oil	
FeO per cent	44.72	19.63	35.07	20.78	14.85	17.34	14.81	15.40	
Fe_2O_3 per cent	12.54	33.84	18.00	33.31	44.72	48.46	33.72	37.10	
SiO_2 per cent	30.52	36.22	28.04	37.19	26.90	26.02	36.43	37.70	
P_2O_5 per cent	0.21	0.21	0.18	0.16	0.62	0.25	0.05	0.23	
MnO per cent	2.81	1.89	3.02	1.93	1.29	1.07	0.72	1.50	
Al_2O_3 per cent	1.10	0.99	2.64	1.06	4.47	0.62	8.02	1.25	
CaO per cent	6.86	6.36	5.88	5.02	5.32	3.39	3.02	4.50	
MgO per cent	1.11	0.70	0.83	0.41	1.83	0.79	1.17	1.81	
Total slag lbs. / ton ingots			14.33		5.70	16.36	5.80	8.70	14.10
Fe, lbs. / ton ingots			6.50		2.44	7.75	2.04	3.48	5.64
Fe, per cent / ton ingots			0.29		0.11	0.35	0.09	0.16	0.25

Table XCI

Checker Chamber Dusts, Quantity and Composition

	Producer gas*		Natural gas	Tar		Coke oven gas	Fuel oil	
	A	B		1	2		Checkers	Boiler tubes
SiO_2 per cent	7.50	10.70	1.88	3.78	1.22	2.30	4.70	....
FeO per cent	1.30	5.32	....	0.51	....	....	....	....
Fe_2O_3 per cent	70.91	65.28	85.28	86.60	61.61†	52.72†	56.00†	24.50†
MnO per cent	0.85	0.43	0.66	0.55	0.65	1.21	0.71	0.77
Al_2O_3 per cent	4.60	9.15	5.37	2.38	0.34	0.82	....	....
CaO per cent	7.60	3.55	3.50	3.15	1.53	3.45	4.80	....
MgO per cent	3.69	1.60	1.12	1.37	0.94	2.50	Zn3.4	Zn14.2
Total dust lbs. / ton ingots	3.8		1.00	5.94	11.97	1.80	....	....
Fe, lbs. / ton ingots	1.9		0.60	3.60	7.37	0.95	....	....
Fe, per cent / ton ingots	0.035		0.026	0.16	0.33	0.042	....	....

*A (Air Chamber) B, (Gas Chamber) depcsit on top of checker brick. †Represents Fe equivalent.

pockets of a 120-ton producer fired furnace which previously had accumulated slag in about the same amount as the previously cited cases for producer firing. After a campaign in which nearly 50,000 tons of ingots were produced the slag accumulation was found to be but 5.7 pounds per ton of ingots with not over 5 per cent of this in the gas pockets. This experience proves that slag carryover may be controlled in furnace end design in a major degree.

Slag accumulation in the pockets may be costly to operations in various ways. Excessive carryover and considerable accumulation often so curtails the free area above the accumulation as to severely hamper, if not cause the complete cessation of, operation. As such a condition will occur late in a campaign it may be necessary to undertake a complete rebuild that might have been deferred for many heats had sufficient free area remained in the slag pockets to permit a continuance of satisfactory operation.

Three Methods Are Used

When the slag pockets are opened for cleaning the accumulated mass is found as a homogeneous lump, having considerable resistance to separation, both as to itself and the containing brickwork. Three general methods of removing the slag mass are used either alone, or in combination. The first is the manual method of breaking it up with bar and hammer or rock drill, which is expensive in labor. The second consists of embedding a number of bars of irregular contour in the bottom when new in such a manner that they later may be attached to a crane hook and the slag removed en masse. Usually, this method is but partially effective, and even though effective it is destructive to the brickwork. The third method consists of drilling the mass and breaking it up by explosives. This method is now seldom

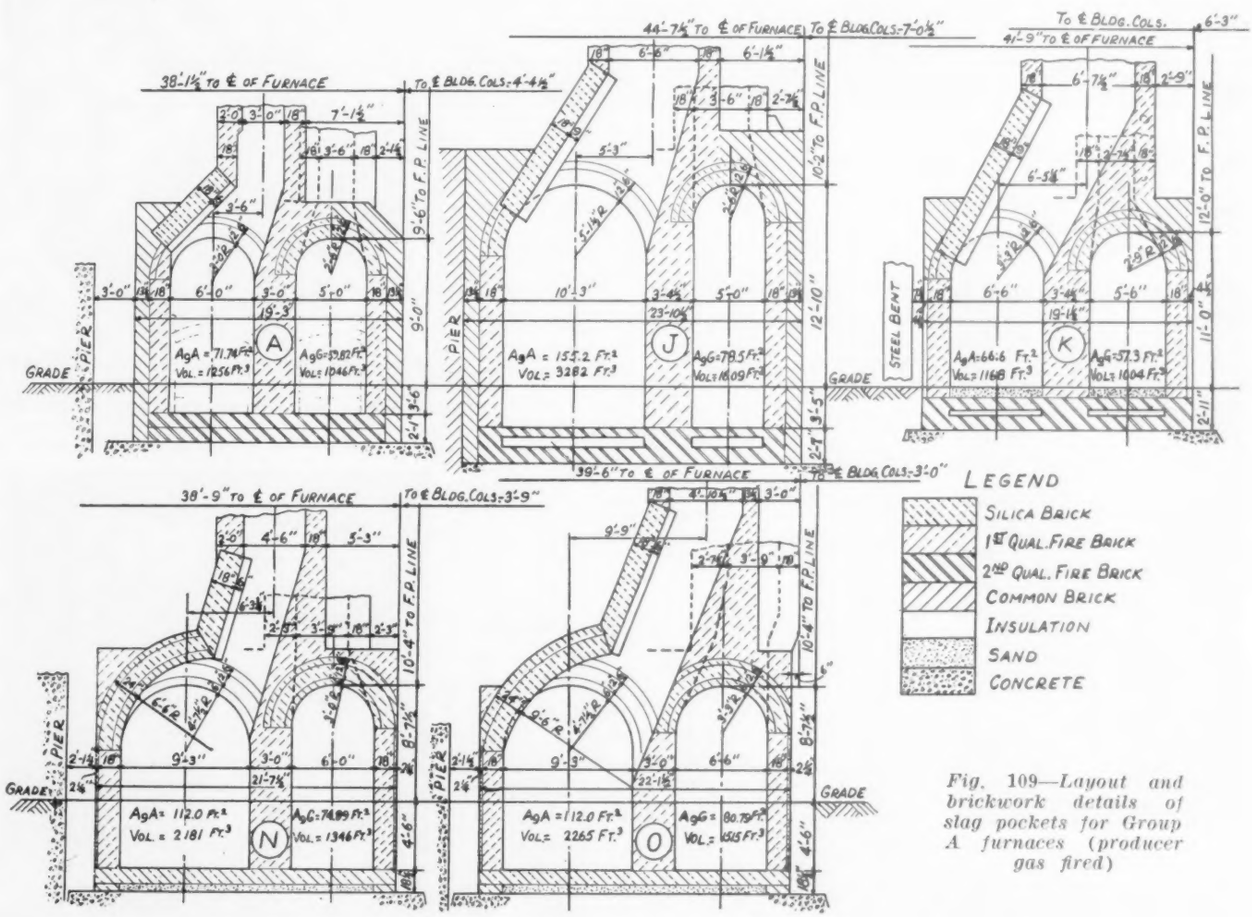
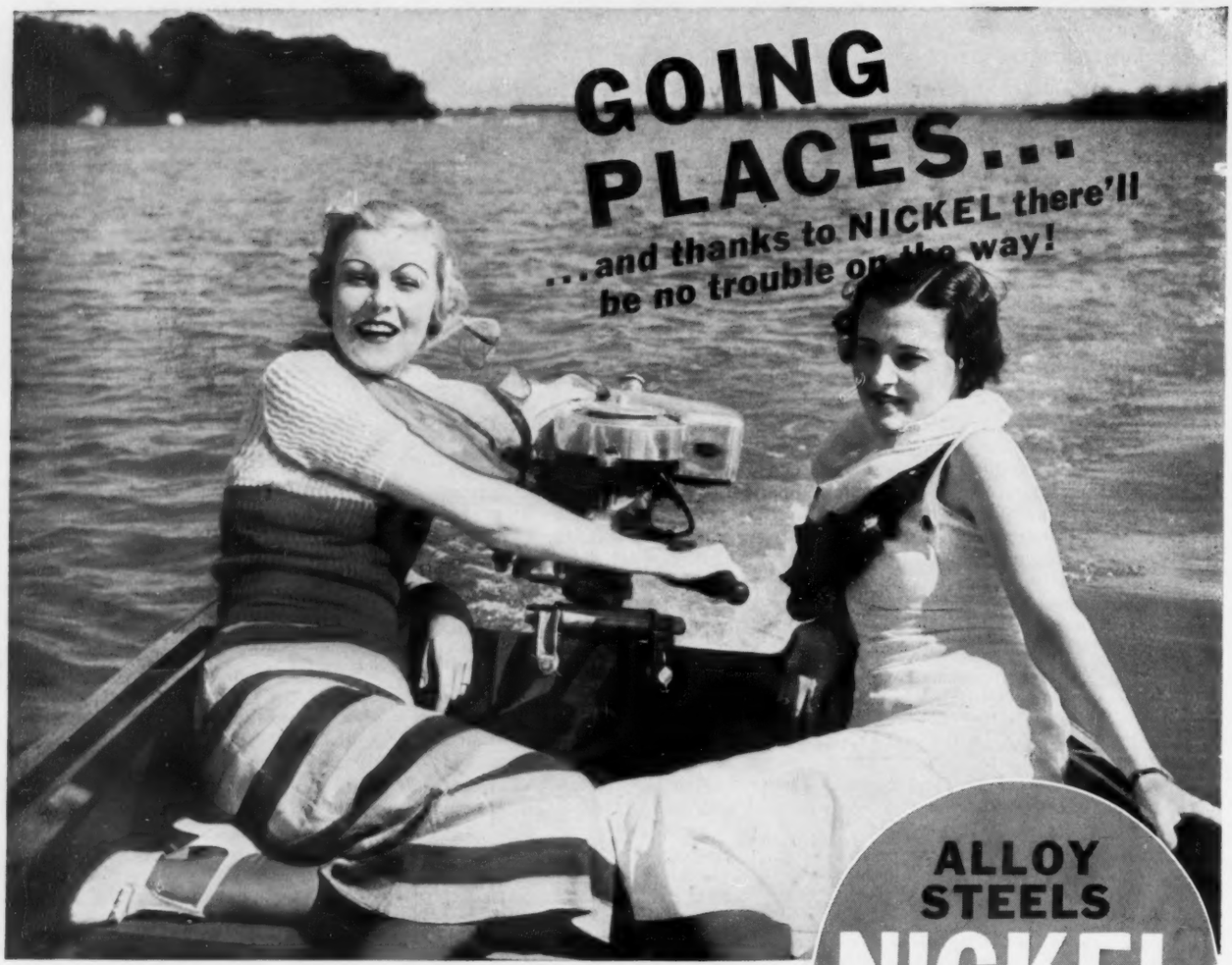
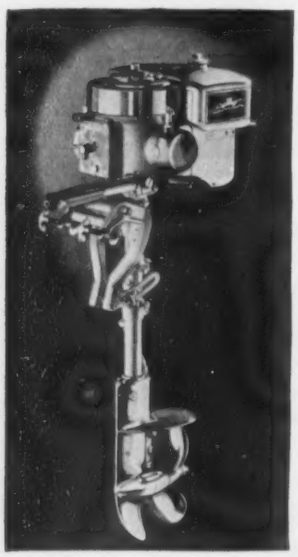


Fig. 109—Layout and brickwork details of slag pockets for Group A furnaces (producer gas fired)



ALLOY STEELS
NICKEL
CAST IRONS

● An outboard motor must be like a western cow pony, small and light but quick on the getaway, and above all, tough and rugged. To assure long, trouble-free life, the gears and similar vital parts in the Johnson "Sea Horse" motors are made of Nickel Alloy Steel corresponding to S.A.E. 2345.



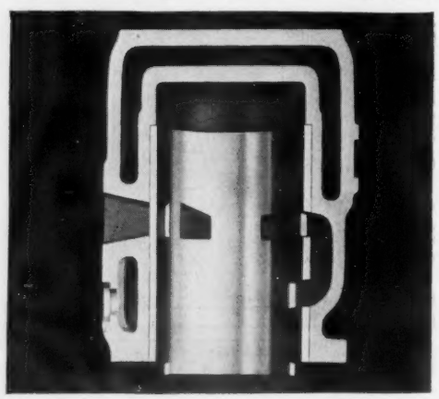
• • •

● (*Left*) This mighty mite among outboard motors — the Johnson "Sea Horse" 300 — the world's smallest all-purpose twin, weighs only 37 pounds yet develops 3.7 B.H.P. at 4000 R.P.M.

• • •

● (*Right*) Cut-away cylinder shows interesting liner made of a special Nickel Cast Iron called Ni-Resist. Ni-Resist has approximately the same coefficient of expansion as that of the aluminum cylinder block, assuring a 20% closer fit of pistons than would otherwise be possible. Ni-Resist is also highly resistant to wear and corrosion, thereby increasing cylinder life. Pistons are made of "Lo-ex", a 2% Nickel-aluminum alloy.

● In modern machinery of every kind, alloys of Nickel are being used to make essential parts more enduring, more dependable. We have an extensive fund of data which is always at your disposal, including the services of our engineers.



THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

used for it has resulted in several fatalities, and the jar of the explosion is liable to injure the roofs of adjacent furnaces and regenerators.

Typical slag pockets are shown in relation to the furnaces and general layout in Figs. 43A to 43P, inclusive. (See STEEL, March 27 and April 3, 1933).

Details Are Presented

Complete details of the general layout design and refractory construction are given in the illustrations of Figs. 109 to 112. These sections are presumed to be taken through the south air downtake while facing north. (For orientation, see Fig. 108). The areas, A_g are computed as the unobstructed cross sections but without allowance for false walls. The length of the slag pocket is taken as the width of the furnace end, Figs. 45A to 45P. The inner length for volume calculation is the figure just mentioned less an 18-inch allowance for the bulkhead at the north end.

While not customarily shown in the drawings false walls universally are used. These are of old brick laid dry, typical designs being indicated in A, Fig. 109, and B, Fig. 112. Their purpose is the prevention of the amalgamation of the slag pocket walls and the slag mass in order to minimize damage to the masonry when the slag is removed. While the false walls modify both the figures of area and volume, no cognizance of the modification is taken in the subsequent discussion.

It will be necessary to here bring

Table XCII

Essential Data Developed in Prior Chapters

	Ingot output per Hr., tons	Critical Area, Square Feet					Gaseous Fluids of Operation, Cu. ft./sec.		
		A_2	A_3	A_6	A_7	A_8	Fuel	Air	Furnace gas
Derivation	LXIV	Table LIII						LIX	
Item	a	b	c	d	e	f	g	h	i
GROUP A									
A	13.16	45.16	5.28	18.00	.....	23.29	211.0	232.0	443.0
J	13.41	50.00	4.65	68.40	.....	73.05	183.0	201.3	384.3
K	13.86	55.32	4.95	43.86	.....	48.81	192.8	212.0	404.8
N	16.97	54.65	6.72	33.75	.....	40.47	255.0	280.0	535.0
O	19.15	56.90	6.72	42.36	.....	49.08	278.0	310.0	583.0
GROUP B									
I	17.22	58.10	.....	42.60	21.25	63.85	.....	268.5	298.3
P	13.57	40.32	.....	55.80	12.70	68.5	.....	228.0	253.0
GROUP C									
G	12.17	71.70	11.64	32.10	.....	43.74	.....	200.8	288.5
L	13.74	54.98	3.55	37.00	17.00	54.0	107.5	235.0	341.0
GROUP D									
B	10.02	64.8	.....	60.0	.....	.....	.....	173.0	192.0
D	9.24	59.72	.....	41.49	.....	.....	.....	161.5	179.5
E	11.58	69.17	.....	56.70	.....	.....	.....	205.8	228.5
H	10.51	45.58	.....	56.56	.....	.....	.....	188.7	209.6
F	11.04	61.60	.....	64.75	.....	.....	.....	187.3	220.3
M	13.44	53.55	.....	58.50	.....	.....	.....	222.1	247.0

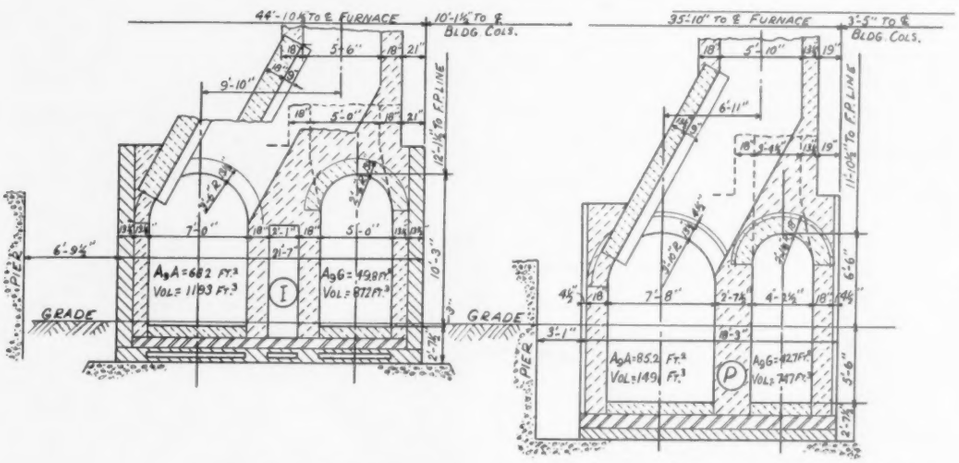


Fig. 110—Slag pockets of B group furnaces or those originally designed for firing producer gas but actually operated with fixed fuels

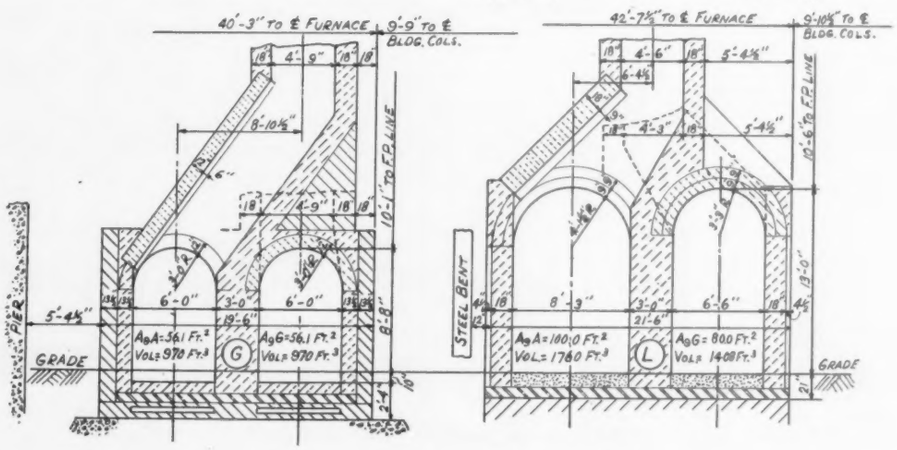


Fig. 111—Slag pockets of the C group furnaces designed for and firing mixed gas

into the discussion certain basic data developed in the prior writings and which will form a basis of the immediate and subsequent discussions. The data are given in Table XCII and the following explanation of the significance of the several items is supplementary. Item a, tons, ingots produced per hour, is the long term average production of the particular furnace, upon which the values of volume flow in the furnace are calculated.

The critical areas of items b to f may be defined as follows: A_2 in open hearth furnace design is the area of the knuckle, monkey wall section and is the unit of area comparison. A_3 is the area of the gas nozzle. In the conventional producer gas fired furnace it governs the relative volume of furnace gases voiding through the gas regenerators in accordance with the ratio:

Volume of furnace gas to gas regenerator system $= A_2/A_3$.

A_6 is the area of the air uptakes, and A_7 is the area of the fuel uptake. A_5 is the combined downtake area and next to A_2 is the most critical area of the furnace and system. In the group A furnaces $A_5 = A_3 + A_6$.

In the group B furnaces and L of group C, $A_5 = A_6 + A_7$ while in the group D furnaces A_6 and A_5 are synonymous. A full discussion of the critical furnace areas and their effects on operation will be found in Part V of the earlier articles presented in STEEL March 27 to June 5, 1933.

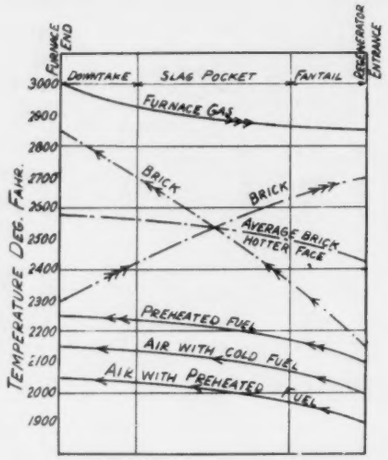


Fig. 113—Chart for use in establishing typical temperature conditions in downtakes, slag pockets and fantails

The volumes of fluids as at 32 degrees Fahr. flowing in the furnace and system are given under items g, h and i. These are developed and will be modified in accordance with the methods as described in articles Nos. 32 to 34, STEEL, May 15, 22 and 29, 1933.

Typical temperature conditions as existing in the system between the downtakes and regenerators are shown in the chart, Fig. 113. The average temperature values to be used in the general discussion concerning fluid flow are listed each followed by the factor of relative change in properties and are as taken from Table LVIII. Outflowing furnace gas, 2900 degrees, K = 2.615; average temperature, hotter face of the brickwork, 2500 degrees; inflowing preheated fuel, 2200 degrees, K = 2.326; inflowing air, preheated fuel practice, 1950 degrees, K = 2.213; inflowing air, cold fuel practice, 2050 degrees, K = 2.260.

In the prior writings it is shown that the maximum allowable effluent gas velocity in the downtakes is 15 feet per second at 32 degrees; that a lesser velocity is desirable, and consequently, as a basis for discussion, the maximum allowable velocity of the furnace gas through the slag pocket is taken as 15 feet per second.

(To be continued)

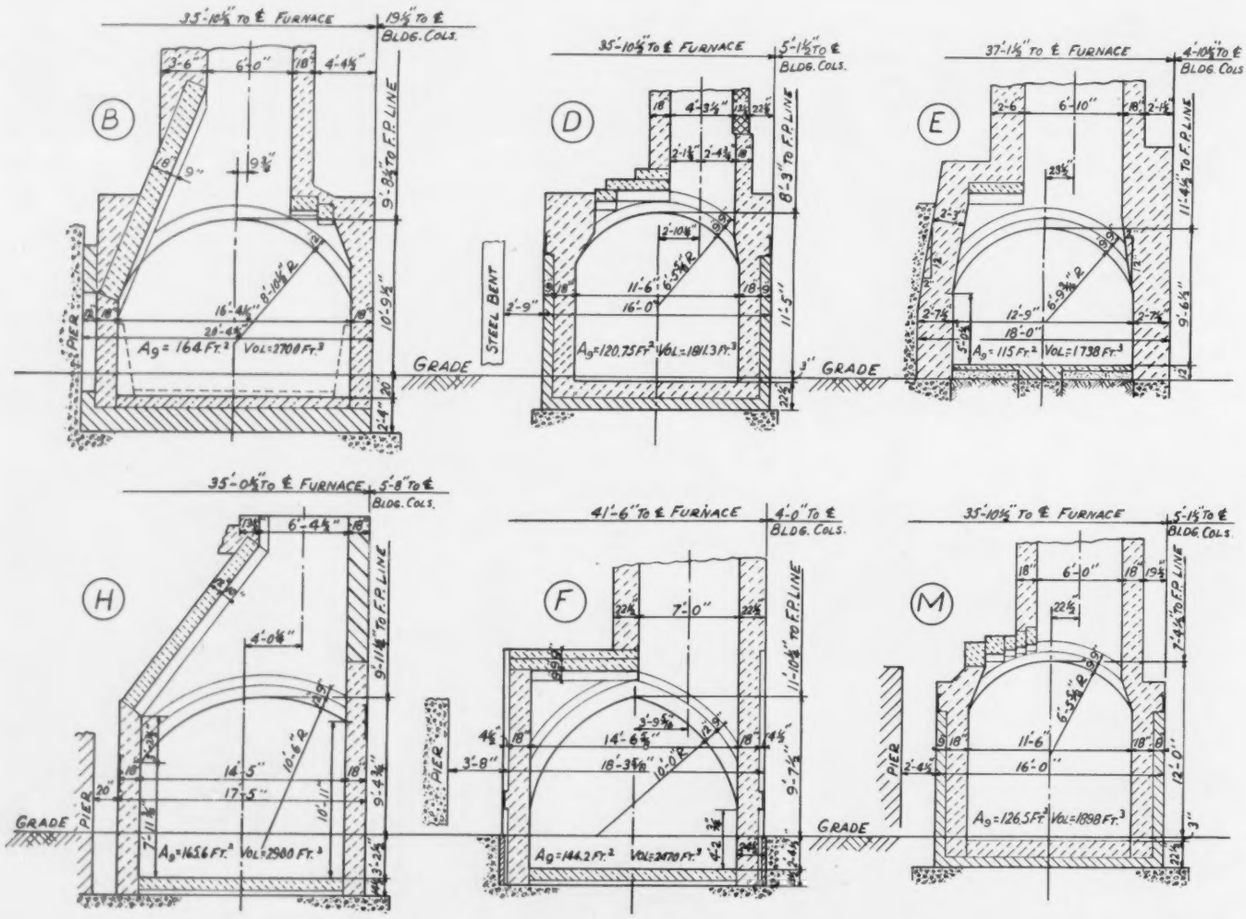
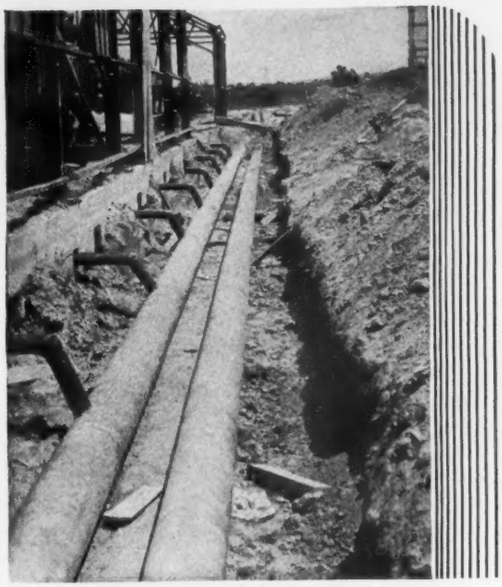
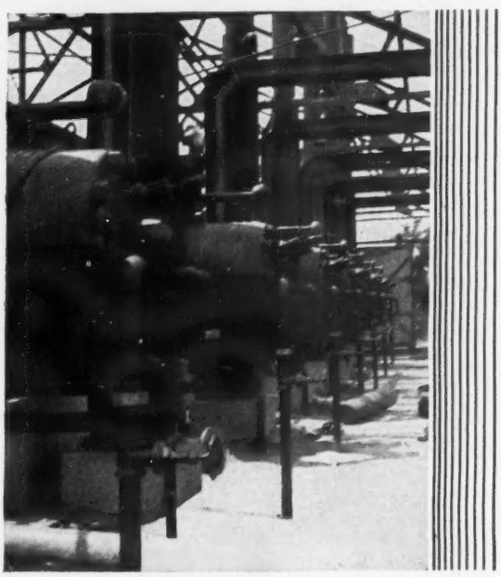


Fig. 112—Slag pockets of the D group furnaces (fixed fuel fired)



This Lindewelded pipe can be buried and forgotten



Lindewelding also can be done on vertical and overhead lines

The Multi-Flame Lindeweld Head in action

80-MILE PIPING SYSTEM FOR GASOLINE PLANT *Lindewelded**

● The construction of an East Texas gasoline plant required approximately 80 miles of welded pipe. The piping system included gathering lines from over 1000 wells. It involved straight line runs, headers, bull-plugs, bends, angles and other specials. Pipe size ranged from 3-in. to 26-in. diameter—5/32-in. to 7/16-in. wall.

The Lindeweld method of oxy-acetylene welding was selected for this project after competitive tests with other types of pipe joints. The company found Lindewelding produced dependably uniform results, cost less, and could be done in less time.

The entire system was tested under pressure. Many of the welding operators had not used Lindewelding previously. Yet the company's engineers reported they did not find a single defective weld.

Lindewelding was brought to this project as a part of Linde Process Service, which is regularly available to Linde Customers—without charge. Linde Offices will gladly give you complete details on Lindewelding. These are located in Atlanta—Baltimore, Birmingham, Boston, Buffalo, Butte—Chicago, Cleveland—Dallas, Denver, Detroit—El Paso—Houston—Indianapolis—Kansas City—Los Angeles—Memphis, Milwaukee, Minneapolis—New Orleans, New York—Philadelphia, Phoenix, Pittsburgh, Portland, Ore.—St. Louis, Salt Lake City, San Francisco, Seattle, Spokane and Tulsa. The Linde Air Products Company, Unit of Union Carbide and Carbon Corporation.

*** Lindewelding is a new method of oxy-acetylene welding developed by the Linde engineering and research organizations. This method requires less oxygen, less acetylene and less welding rod. Welds can be completed in less time. Yet Lindewelding involves only a special flame adjustment and a "back-hand" technique, together with Oxweld No. 24 Lindeweld Process Welding Rod. When circumstances permit, the Multi-Flame Lindeweld Head can be used. This will further increase the speed of Lindewelding. It costs only $7.75. On pipe line construction Lindewelding is consistently saving 15 to 40 per cent in welding time, rods and gases.**

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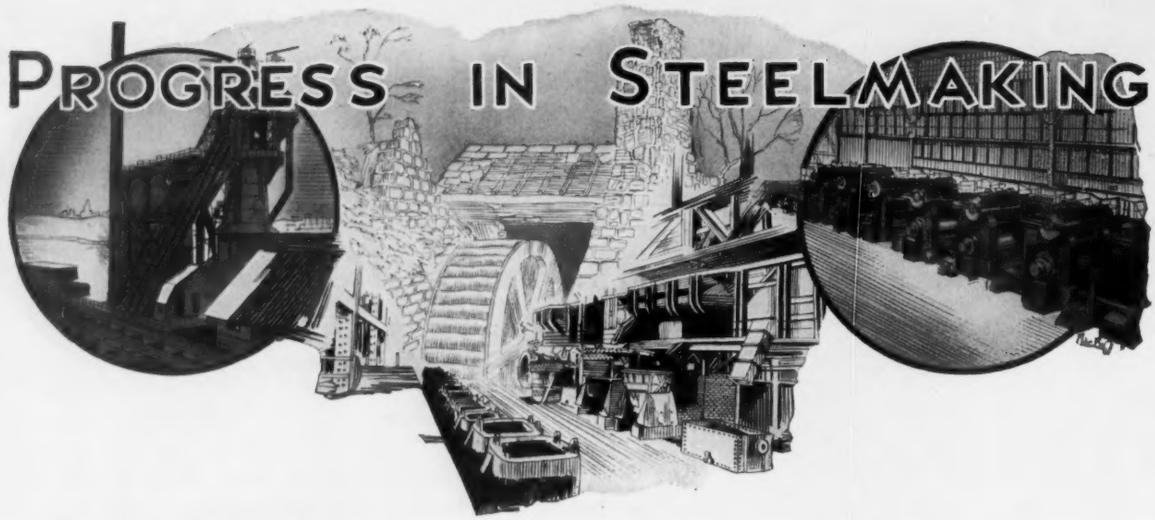


Steel Sheet Minimizes Wear

Mold and stool wear caused by the stream of metal when the ladle nozzle is first opened, is decreased at an Ohio open-hearth shop by placing a mild steel sheet of 14 to 16 gage on the stool before pouring the heat.

♦ ♦ ♦

Checks Activity of Rust

Penetrating and soaking into rust, rendering it dormant to further activity, is the purpose of a newly developed paint. It is intended to be used as a primer coat with the finishing coat of paint applied on top. The new material is recommended for use on steel surfaces covered with rust and which are difficult to clean.

♦ ♦ ♦

Coating Affords Protection

Material with a chlorinated rubber base that can be formulated into both an acid and alkali resisting paint is a recent development. The formulated paint produces a hard, tough film which affords protection against corrosion to structural steel, steel buildings, roofs, power line structures, steel plants, etc. A steel company, which recently tested the paint's resistance to abrasion and scratches, handled the painted steel with the crane, picking it up and setting it down many times, in the same manner as it would be handled on the regular paint skids in the shop and in loading cars. The coating did not scratch nor wrinkle as red lead. The only evidence of marring due to the chains scraping along the paint or the steel scraping against itself were dull marks on the surface of the paint which showed only slightly and did not expose the surface of the steel.

♦ ♦ ♦

Bumpers Reduce Impact Load

Use of spring bumpers or spring-mounted die boxes has reduced the impact load set up by quick starting blocks in the wire mills and this feature, coupled with water or low-pressure air cooling, has increased the production of wire per unit of die wear. Great strides also have been made by the application of carbide dies in the cleaning house where the wire, rod or tubing is prepared for the finishing mill.

If you desire further information on any idea, announcement, lead or suggestion presented, please write us. Perhaps you know of an idea or "shop wrinkle" that has effected a reduction in operating costs at your plant. If so, won't you send it along?

The Editors

Five Money-Saving Ideas

Application of the carbide extruding die has improved the surface of the extruded portion of bolts so that the thread, which is rolled on this portion, is more accurate as to pitch diameter and of a finer quality. Close tolerances on pitch diameters are maintained. The burnishing die affords a nut held to close limits, and with sharp corners, thus permitting the use of close fitting wrenches which eliminate the mutilation of these nuts during the assembly operations.

♦ ♦ ♦

When brake wheels on overhead cranes are hardened, large savings are afforded in brake linings which frequently surpass those through long life of the wheel itself.

♦ ♦ ♦

Test holes drilled in the lining of a blast furnace disclose whether the stack is built up on the cold side or cut away on the hot side. If the lining is gouged out on one side smelting practice will be improved, according to blast furnacemen, if the charging apparatus is relocated so that its center coincides with the new center of the lining.

♦ ♦ ♦

Fluorspar should be used sparingly in low-carbon heats because it has a tendency to make "wild watery slags" which erode the furnace banks and ladle linings according to an open-hearth operator.

♦ ♦ ♦

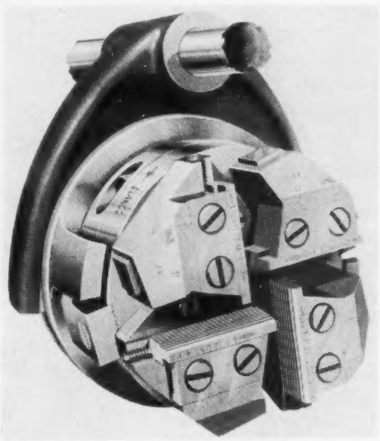
Salvaging stainless steel bars is accomplished at a forging plant in a simple manner. The short ends of the bars are stored in bins according to size and are issued to the hammer shop to apply against work requiring short blanks. By this arrangement stainless steel costing about 25 cents a pound is prevented from being sold as scrap for about 1 cent a pound.

ADVERTISING PAGES REMOVED

NEW EQUIPMENT

Revolving Die Head With Taper Attachment—

Landis Machine Co., Waynesboro, Pa., recently placed on the market a revolving die head with taper attachment for producing tapered threads. The head, shown herewith, is an adaptation of the ¾-inch Lanco head but has a standard capacity up to 1¼



Taper attachment features this Landis revolving die head

inch American tapered pipe thread with a maximum thread length of 1¼ inches. By using special oversize chaser holders, diameters up to 2¾ inches can be cut with a maximum thread length of 1⅛ inches. Any degree of taper can be provided up to 2 inches taper per foot by using the proper operating ring and cam shoe. The head is suitable for application to practically any make of automatic chucking machine employing a revolving type of die head.

Taper cutting action is obtained through a cam which is integral with the operating ring. Attached to the closing ring of the die head is a cam shoe which is machined to correspond to the operating cam. As the threading spindle moves forward the closing yoke on the die head contacts the usual adjustable stop nut on the stop bar on the machine just as the chasers begin to form the thread. At this point the forward travel of the operating ring is retarded while the die head itself continues to move forward to produce the thread. As the die head continues to move forward onto the work this construction causes the chasers to open gradually, thus generating a tapered thread. When the cam shoe has traveled the full length of the cam on the operating ring the die head automatically opens. Adjustment for thread length is obtained by properly setting the stop nut on the stop bar.

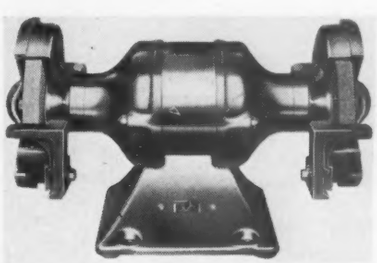
Other new items of industrial equipment to be presented shortly in STEEL will include:

Single cycle gear finishing machine, Gleason Works, Rochester, N. Y.
Portable electric hammer and drill, Wodack Electric Tool Corp., Chicago.
Automatic dry-plate filter, Coppus Engineering Corp., Worcester, Mass.
Tilting arbor saw bench, Tannewitz Works, Grand Rapids, Mich.
Reset controller, Taylor Instrument Cos., Rochester, N. Y.
Cone head motor-driven lathe, Sebastian Lathe Co., Cincinnati.
Heavy-duty punch, Whitney Metal Tool Co., Rockford, Ill.
High frequency electric screwdriver, Buckeye Portable Tool Co., Dayton, O.
Electric vibrating feeder, Jeffrey Mfg. Co., Columbus, O.
Hydraulic variable speed transmission, Vickers Inc., Detroit.
Flexible coupling, Lovejoy Tool Works, Chicago.
Shovel, crane, dragline, Link-Belt Co., Chicago.
Welding fixture, Harnischfeger Corp., Milwaukee.

♦ ♦ ♦

Bench Grinder—

Hisey-Wolf Machine Co., Cincinnati, recently has placed on the market a motor driven bench grinder suitable for many light tool and miscellaneous grinding jobs. The machine which is shown in the accompanying illustration, is of the double end type with a 1/3-horsepower motor, and uses wheels 7 x ¾-inch. The grinder is said to be built sturdily throughout. The motor is equipped with ball bearings. Two types of motors are available; one for 115 and 230 volt direct current, and the other for 220 and 440 volt, 3 phase, alternating current.

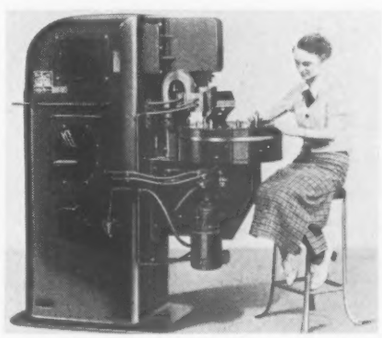


Hisey-Wolf double end type motor-driven bench grinder

♦ ♦ ♦

Automatic Electric Resistance Heating Machine—

Taylor-Winfield Corp., Warren, O., and Detroit, recently brought out a machine, shown herewith, designed to heat electrically, tapered studs made from screw machine stock for subsequent hot forming in a press. Meeting a demand for 1000 heated studs per hour, the actual current dwell for the heating of two pieces simultaneously is less than three seconds. A 75 kilovolt-ampere transformer is used, mounted within the base.



Taylor-Winfield automatic electric resistance heating machine

Except for feeding of the studs by hand into the indexing fixture, the operation of the machine is entirely automatic. The dial mechanism is operated by a small motor through a gear reduction, moving the dial from station to station at a speed convenient for loading. Upper electrodes are brought to bear on the studs by means of an air cylinder operated from the dial indexing mechanism, all movements being so synchronized that no attention from the operator is necessary. After the studs are heated to the desired, predetermined temperature, they are ejected by air cylinder into an inclined chute which

carries them to the press for the hot forming operation.

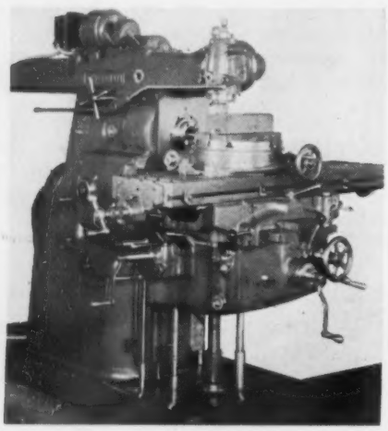
Equipment can be furnished for a multitude of heating operations, both large and small, and for practically any shape of material. The process is well adapted to the production heating of wire or slugs from which bolts are made; especially for metals not suitable for cold forming.

♦ ♦ ♦

Motor-Driven Universal Milling Attachment—

Cincinnati Milling Machine & Cincinnnati Grinders Inc., Cincinnati, recently introduced a motor-driven universal milling attachment, shown herewith, which affords fewer setups and more accurate dimensions between milled surfaces. The attachment is a self-contained unit, built into the machine overarm, replacing the standard overarm. It does not in any way interfere with the normal use of the overarm and arbor supports, as the spindle carrier can be easily swiveled out of the way.

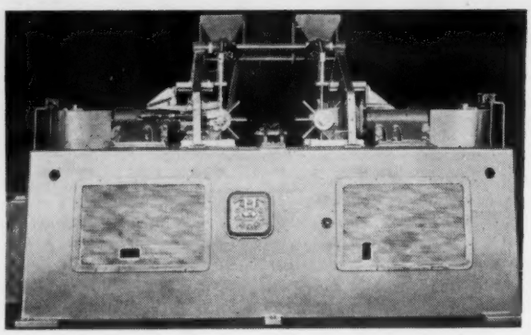
A constant speed one horsepower motor is mounted on top of the overarm, and connected to the speed box by means of a flexible coupling. Nine



Cincinnati motor-driven universal milling attachment

changes of speed, ranging from 100 to 1030 revolutions per minute, are obtained through sliding gears. Speed changes are made easily from the left-hand side of the column by means of two gearshift levers.

Cutters are interchangeable between the attachment spindle nose and the spindle of the modern Cincinnati miller. One direction of spindle rotation is standard, but a reversing switch can be supplied, at extra cost, for reversing the rotation of the motor and spindle. Flexibility of the motor-driven milling attachment may be increased by the addition of an auxiliary hand feed quill device, supplied at extra cost. This device is convenient for drilling and boring holes at an angle, not exceeding 3 inches in depth.



AUTOMATIC stud welder developed by Thomson-Gibb Electric Welding Co., opens new field for resistance welding

Automatic Stud Welder—

Thomson-Gibb Electric Welding Co., Lynn, Mass., recently developed a new resistance welding machine which provides a way to manufacture on a mass production scale, parts that now require slow and expensive casting. The unit, shown above, welds studs to the circumference of pipe.

Operation is entirely automatic—the studs are loaded into the hoppers at the top of the machine from which they pass down into the magazines below and feed into position in the multiple indexing electrodes. Each pair of studs is attached at the same time by a series weld, saving time and power. Exact alignment and spacing are controlled by the indexing fixtures and the entire operation is performed at high speed. The same principle can be applied to welding bosses or studs to fabricated stampings or similar parts.

♦ ♦ ♦

Two-Way Industrial Telephone System—

Bank's Radio Mfg. Co., 6317 North Kenmore avenue, Chicago, recently introduced a two-way loud speaking telephone system which because of its simplicity and flexibility, provides a practical industrial inter-communication system. It is designed to operate in places where ordinary telephone equipment will not withstand physical and chemical hazards, the manufacturer states.

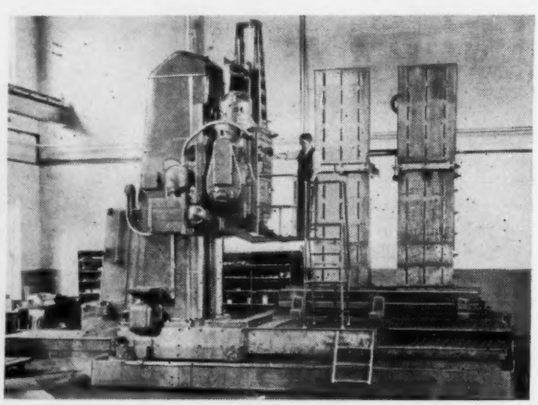
A party calling from any point in the system can call to any other point on the system and get an instantaneous reply. The party answering the call can respond from a distance of ten to forty feet away from the speaking unit in a normal voice without operating a switch, it is claimed. In this regard also, noises which normally interfere with regular telephonic communication will not carry over this system—that is, the voice always predominates in spite of heavy production noises. This system is not limited to one building or a group of buildings but can be extended along cables for distances of twelve miles or more.

♦ ♦ ♦

Automatic Toolroom Machine

Pratt & Whitney Co., Keller division, Hartford, Conn., recently announced a new automatic toolroom machine of increased size and range. In primary function, namely the reproduction of dies, punches, welding fixtures, etc. from a master or model, and in principle of design and construction, this large unit is similar in many ways to previous Keller BG types. Accuracy of work is also such that little hand finishing is necessary.

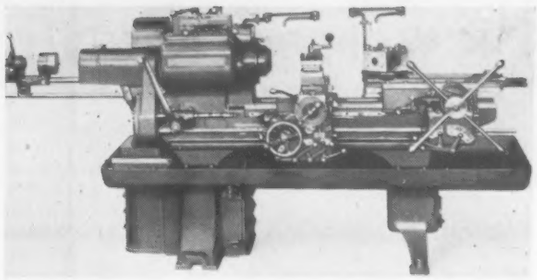
The machine is operated by a simple electrical control through which the shape of a master or model is reproduced automatically. It may be used for two-dimension work, as in profiling or for three-dimension cutting of solid forms, such as dies. In either type of operation an electric tracer mounted on a bracket over the milling cutter passes over a master form bolted above the work on



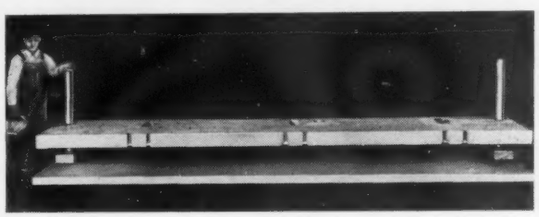
GENERAL view of Keller automatic toolroom machine. General trimness of the unit resulting from elimination of separate control cabinet, simplification of exterior wiring, harmonious design of gear boxes, and interior counterweighting is well illustrated

the fixture-upright, and the cutter duplicates the tracer path precisely. The tracer controls a series of magnetic clutches which actuate the various motions of the machine. These motions comprise horizontal movement of the column on the bed; vertical travel of the saddle; and transverse movement of the entire head on the saddle. In addition, the new machine has spindle adjustment of 9 inches to and from the work.

Designed to cut an impression 12 feet long by 6 feet high by 30 inches deep without resetting of the die block, this new, large machine, the BG-3, is suitable for the economical production of the enormous dies made necessary by radical changes in automobile bodies—the streamline and airflow designs and, more recently, the all-steel turret tops. It is almost two and one half times as heavy as the largest previous Keller BG machine, weighing, with fixture, 154,000 pounds, as compared with 64,000 pounds of the largest previous machine and fixture. In height the new machine stands 21 feet, 1 inch, while in length it is 32 feet, 5 inches and in depth, 19 feet, 3 inches. Many unique features have been incorporated in the new design.



BED of this Warner & Swasey lathe is made of high tensile nickel iron with a high percentage of steel. All gears are alloy steel and heat treated



LARGE die set built recently by Danly Machine Specialties Inc. demonstrates adaptability of torch cut and weld method in the use of steel plate

♦ ♦ ♦

Die Set—

Danly Machine Specialties Inc., Chicago, recently designed a die set for automotive frames torch-cut and welded from steel plate. Shown above, this die set is 24 inches wide, 192 inches long and weighs 10,900 pounds. Steel bosses are screwed and dowelled in place and carry bronze bushings 4 inches inside diameter and 10¼ inches long. Guide posts are 4 inches in diameter and 45 inches long. Shoe thickness is 3 inches and holder 5¼ inches. The relief for bolt heads in bolt slots and cut-outs in shoe and holder demonstrate in an interesting way the adaptability of the company's torch-cut and weld method to the building of any desired die set or other steel plate specialty.

♦ ♦ ♦

Turret Lathe—

Warner & Swasey Co., Cleveland, is placing on the market a No. 4 universal turret lathe of a new size, and embodying a number of improvements. Shown herewith, this machine like others in its line, has been developed to utilize to best advantage cemented tungsten carbide, in addition to high-speed steel cutting tools. It has 12 spindle speeds which range from 30 to 751 revolutions per minute and a 7½ horsepower motor may be used. Provision is also made for the application of a two-speed motor, giving an additional 12 speeds. It is a stronger machine throughout with increased capacity—swing 18¼ inches and bar capacity 1¾ inches.

A circumference binder ring automatically clamps the turret after indexing. Travel of the turret slide is 12 inches, with the power feed applied through a friction clutch. A feature of the cross slide is its large dial so graduated that 1/16 inch movement of its rim advances the slide 0.001-inch. A new automatic indexing square turret offers increased speed in manipulation.

Ratchet type bar feed is designed for fast operation at high spindle speeds. Bar stock is held firmly concentric with the spindle bore by a revolving feed chuck mounted on antifriction bearings. This affords greater speed in loading and less fatigue to the operator in releasing and gripping the bar.

Levers are centrally located for ease of operation. Distinct improvements have been made in the taper attachment, making it usable for all cross slide tools mounted front and rear positions. This unit is of rigid construction and may be clamped from the operator's position.

♦ ♦ ♦

Abrasive Band Grinder—

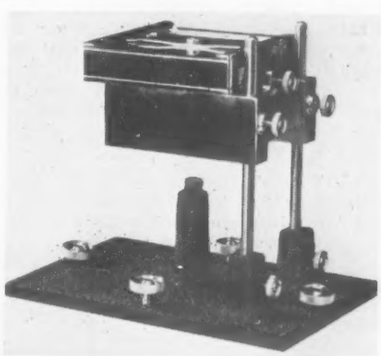
Walls Sales Corp., 96 Warren street, New York, recently brought out an M-6 abrasive band grinder of the pedestal type. It is equipped with a ¾-horsepower motor with roller chain drive. Built for production work, the machine runs 1900 feet per minute. Other features include single thumbscrew arrangement for belt alignment, removable bevel attachment, dustproof antifriction bearings and an improved lubricating system.

♦ ♦ ♦

Instrument for X-ray Diffraction Analysis of Metals—

St. John X-Ray Service Inc., 30-20 Thomson avenue, Long Island City, N. Y., recently announced a new pinhole instrument for high-speed, high voltage X-ray diffraction analysis of metals. It is a modification of the usual pinhole method using tungsten radiation at 200,000 volts or more, as in radiographing castings and the like, so that a powerful beam of X-rays passes through ⅛ inch of steel, for instance.

If desired, entire sheets or formed articles can be mounted in the instrument, shown herewith, or specimens can be cut without affecting the portion to be examined. Exposures of two hours or less are sufficient. The method has been applied to brass, tin, steel and other metals and their alloys in the study of mechanical working, heat treatment, extrusion, aging, the effect of exposure to gases, etc., to determine internal strain and so on. One or more of the new instruments can be mounted on existing radiographic X-ray equipment and may be used simultaneously while inspecting castings of welded pressure vessels.



Instrument for X-ray diffraction analysis of metals introduced by St. John X-Ray Service Inc.

New Trade Publications

BORING MACHINE—B. M. Root Co., York, Pa., in bulletin No. 80 describes its style D200 electro-hydraulic borer, horizontal multiple type.

HOISTS — Curtis Pneumatic Machinery Co., St. Louis, Mo., has published a folder describing and illustrating a number of uses for its line of air power cranes and hoists.

EXCAVATORS — Bucyrus-Erie Co., South Milwaukee, Wis., has issued a folder describing and illustrating the features of design of its 10-B type excavator.

GENERAL PURPOSE MACHINE—International Machine Tool Co., Indianapolis, has issued a bulletin on its universal flexible general purpose machine, adapted to a wide variety of uses in the shop. Illustrations show many of its applications.

ROLLER BEARINGS — Tyson Roller Bearing Corp., Massillon, O., has issued a bulletin on its cageless tapered roller bearings, giving engineering data on their application to mine and quarry cars. It is illustrated and presents many data on application.

SAWS AND KNIVES—Saw & Knife Specialty Co. Inc., Cleveland, manufacturer of Supreme brand nickel alloy steel band saws, machine knives, shear blades and similar products, has issued a series of leaflets describing these products and giving their characteristics and advantages.

STAINLESS STEEL — Republic Steel Corp., Youngstown, O., through its central alloy division, Massillon, O., has issued a folder on application of its Enduro stainless steel in the textile industry where its use allows dyes to be used in acid solution without the slightest change in tints.

FORGED SCREWS—Holo-Krome Screw Corp., Bristol, Conn., has started a loose-leaf catalog of its products, to which sheets will be added from time to time to keep it up to date. Illustrations, engineering data and various other information are included on its fibro forged screws for a wide variety of uses.

LUBRICATION—A series of bulletins has been issued by the Standard Oil Co. (Indiana), including service for mine locomotives, diesel engine bearings, beaters and jordans and diesel air compressors. Another bulletin is devoted to discussion of the value of the service of the lubrication engineer.

CABLE ACCESSORIES—General Electric Co., Schenectady, N. Y., has issued a new publication, GEA-1839, on cable accessories, as a companion book to its No. GEA-1731, issued last year on how to make cable joints. The two form a valuable handbook to those engaged in work involving jointing and terminating insulated cable.

STORAGE WATER HEATER—American District Steam Co., North Tonawanda, N. Y., in a current bulletin, No. 35-75, illustrates and describes its storage type water heater. It is filled with data to guide the prospective buyer of this class of equipment. In loose-leaf form it allows additional sheets to keep abreast of developments.

WELDING ELECTRODES—Metal & Thermit Corp., 120 Broadway, New York, in a current booklet presents technical data, including principles of design and operation, as well as physical properties and chemical analyses of deposited metals from its all-mineral coated welding electrodes. Illustrations show application of various types of electrodes.

OVENS — Gehnrich Corp., Long Island City, N. Y., has published a booklet on its line of foundry ovens for core baking, mold drying, pasting, preheating, aging, normalizing, annealing and japanning. In addition to a discussion of the features of the various ovens, numerous installation photographs are reproduced to show various designs of core and mold ovens.

METAL PRODUCTS—Under the title, "Masters of Metal," Scovill Mfg. Co., Waterbury, Conn., tells of the development of its works from a small beginning to a plant producing metal parts for 300,000 different products. On order it supplies parts for devices that touch the life of everyone every day. Methods of production and the growth of the business are described graphically and profusely illustrated.

AERIAL WIRE ROPE TRAMWAYS—American Steel & Wire Co., Cleveland, has issued a cloth-bound book on its aerial tramways, using its wire rope, for handling materials at considerable distance through the air. Illustrations present various installations for many purposes, as well as drawings showing details of construction. Rope, pulleys, supporting stands and other details are fully illustrated and described.

SCRAP—Globe Iron Co., Jackson, O., has distributed a bulletin on "The Effective Use of Cast Iron Scrap in the Cupola Charge" which contains the results of an investigation of the Ohio state university, college of engineering, in co-operation with the Globe Iron Co. The work was prepared by A. H. Dierker and R. P. Schneider.

SEAMLESS TUBING — Summerill Tubing Co., Bridgeport, Pa., in a current catalog sets forth the case for cold-drawn seamless tubing and gives complete treatment to mechanical tubing, pressure tubing, stainless steel tubing, special alloys and radio nickel tubing. The publication is really a handbook of the subject. Tables of weight per foot cover various classifications and stainless corrosion data are also included.

BRONZE CASTINGS—A 64-page catalog on its Taurus bronze castings, has been published by David Brown & Sons Ltd., Huddersfield, England, designed as a practical treatise on composition, properties, manufacture and application of bronze castings for engineering purposes. Information is given on approximate chemical composition, average physical properties and a general description of the metal casting for a number of bronze mixtures.

Gas Combustion Data Interpreted

(*Concluded from Page* 33)

combustion is premixed with the gas, as given in the first part of this discussion, may be applied to this type of nozzle-mixing burners. Instead of obtaining the air required for combustion from the surrounding atmosphere, however, it is supplied through separate ports in the burner. Since the air has to diffuse into the gas stream the combustion action will be slower than with the premixed air and gas burner. Likewise, the flame will necessarily be longer. Its length will be a function of the number and placement of the air and gas ports as well as the velocity of the air and gas streams. Generally, considerably less gas can be burned per cubic foot of combustion space than with the premixed burner.

As seen from the curve in Fig. 2, more excess air is required with this type of burner to obtain complete combustion (that is repress dissociation) than when the premixed type of burner is employed. Because of its flexibility and its ability to control the length of flame, the nozzle mixing burner is employed in furnaces where long luminous flames are desired. The relative merits of this type of heating, as compared to that discussed for burners employing totally premixed air and gas, is a debatable question and cannot be considered here.

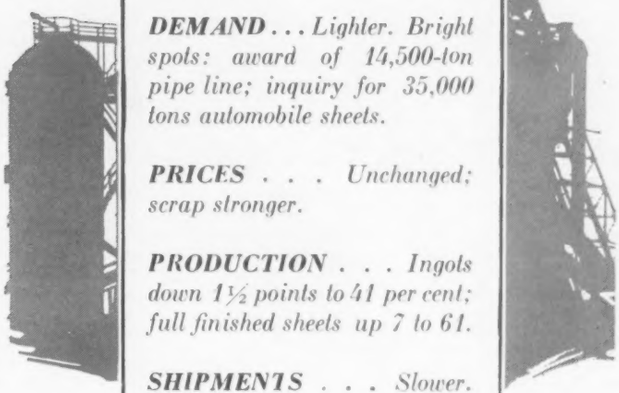
In general it may be said that far greater quantities of gas can be completely burned per cubic foot of combustion space than is now the general practice. Through proper furnace design and proper precautions in the selection of burner equipment, considerably more heat can be obtained from the burned gas by converting it into more useful forms. In this manner not only smaller furnaces can be constructed, thus reducing the initial cost, as well as the amount of heat lost to the atmosphere, but also the resultant furnace will be a more efficient heat exchanger.

More Action in Steel Market; Prices Steady

Large Pipe Line Award;

A Heavy Sheet Inquiry;

Rate Off 1½ Points



MARKET IN TABLOID

DEMAND *. . . Lighter. Bright spots: award of 14,500-ton pipe line; inquiry for 35,000 tons automobile sheets.*

PRICES *. . . Unchanged; scrap stronger.*

PRODUCTION *. . . Ingots down 1½ points to 41 per cent; full finished sheets up 7 to 61.*

SHIPMENTS *. . . Slower.*

IRON and steel prices remain steady, after two weeks freedom from code control.

Consumers, apparently reassured for the present of the market's stability and by the industry's announced determination to uphold wages and fair practices, show more confidence, and less hesitation in making new commitments.

Demand, however, is declining—as reflected in a further reduction of 1½ points to 41 per cent in steelworks operations last week.

The low level of consumers' stocks, with the necessity for buying regularly as requirements arise, is expected to exert a stabilizing influence. Producers are not endeavoring to force the market.

Some bids recently submitted on public works projects have been returned unopened, evidently with a view to obtaining new prices, and in the steel industry it is felt that the first real test may develop in connection with government work. Minor irregularities are reported in prices of reinforcing steel for some federal jobs.

Chevrolet has just placed a contract with a Philadelphia parts manufacturer which will require 35,000 to 40,000 tons of heavy-gage sheets, and this is expected to be followed shortly by the first large inquiry for automobile material to come into the open-price market. Automobile assemblies during the week increased 22,500 units to about 88,000.

Fresh impetus may have been given to many large private projects by the return to fundamentals in government. Demand for long-distance oil and gas lines, long dormant, give indications of reviving. Atlantic Refining Co., Philadelphia, has awarded 14,500 tons of steel pipe to National Tube Co. for a 180-mile line from Pittsburgh to Harrisburg, Pa., and inquiries are expected soon for two or three lines in western fields. Mississippi Valley Barge Lines Co., Cincinnati, will be in the market this week for 30 barges, requiring 4000 to 6000 tons of plates.

Structural shape awards in the week, 5406 tons, showed little change. Grand Trunk Western purchased 8450 tons of rails, and bids were taken on 9135 tons for track relocation in the Muskingum, Ohio, conservancy district. Only two domestic freight cars were awarded in May, bringing the total for five months to 1182, compared with 21,424 in the same period last year.

May erased much of the lead which this year held over 1934 in steel and pig iron output. Daily average ingot production was 96,372 gross tons, 3.8 per cent lower than in April; and the month's total was 2,602,054 tons, down 0.16 per cent. The five months' record is 13,615,360 tons, 3.3 per cent ahead of the first five in 1934. A month ago the lead was 12 per cent.

Daily average pig iron output, 55,986 gross tons, was only 0.48 per cent higher than in April, while the total, 1,735,577 tons, was up 3.8 per cent. Five months' production is 8,271,471 tons, 4.5 per cent larger than last year. At the end of four months this year the gain was 11.5 per cent. Stacks active May 31 numbered 96, one less than April 30.

Due to a sharp drop in scrap shipments, iron and steel exports in April declined 36 per cent to 205,336 gross tons. Imports increased 34.9 per cent to 28,866 tons. The balance of trade for four months, however, was on the favorable side, as exports—1,019,648 tons—were up 28.8 per cent, and imports—101,964 tons—down 10 per cent.

Pittsburgh district steelworks operations last week declined 3 points to 32 per cent; Wheeling 14 to 48; Birmingham 2 to 52½; New England 3 to 60. Others were unchanged.

STEEL's iron and steel price composite has advanced 2 cents to $32.45, reflecting an increase of 8 cents to $10.58 in the scrap index. The finished steel composite holds at $54.

COMPOSITE MARKET AVERAGES

	June 8	June 1	May 25	One Month Ago May, 1935	Three Months Ago March, 1935	One Year Ago June, 1934	Five Years Ago June, 1930
Iron and Steel	$32.45	$32.43	$32.41	$32.35	$32.26	$32.96	$33.28
Finished Steel	54.00	54.00	54.00	54.00	54.00	55.08	52.37
Steelworks Scrap	10.58	10.50	10.50	10.27	10.75	10.32	13.11

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	June 8, 1935	May, 1935	Mar., 1935	June, 1934
Steel bars, Pittsburgh	1.80c	1.80c	1.80c	1.90c
Steel bars, Chicago	1.85	1.85	1.85	1.95
Steel bars, Philadelphia	2.11	2.11	2.09	2.19
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.85
Shapes, Pittsburgh	1.80	1.80	1.80	1.85
Shapes, Philadelphia	2.01½	2.01½	2.00½	2.05½
Shapes, Chicago	1.85	1.85	1.85	1.90
Tank plates, Pittsburgh	1.80	1.80	1.80	1.85
Tank plates, Philadelphia	2.00	1.99	1.98½	2.03½
Tank plates, Chicago	1.85	1.85	1.85	1.90
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	2.00
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.65
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	3.25
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	2.10
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.75
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.35
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.60	2.60	2.60	2.60

Semifinished Material

Sheet bars, open-hearth, Youngs.	$28.00	$28.00	$28.00	$30.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	30.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	29.00
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00

Pig Iron

Bessemer, del. Pittsburgh	$19.81	$19.80	$19.76	$19.76
Basic, Valley	18.00	18.00	18.00	18.00
Basic, eastern, del. eastern Pa.	19.76	19.81	19.76	19.76
No. 2, foundry, del. Pittsburgh	19.31	19.30	19.26	19.26
No. 2, foundry, Chicago	18.50	18.50	18.50	18.50
Southern No. 2, Birmingham	14.50	14.50	14.50	14.50
No. 2X eastern, del. Philadelphia	20.68	20.68	20.63	20.63
Malleable, Valley	18.50	18.50	18.50	18.50
Malleable, Chicago	18.50	18.50	18.50	18.50
Lake Superior charcoal, del. Chi.	24.25	24.25	24.04	24.04
Ferromanganese, del. Pittsburgh	90.13	90.13	89.79	90.00
Gray forge, del. Pittsburgh	18.67	18.66	18.63	18.88

Scrap

Heavy melting steel, Pittsburgh	$12.50	$12.00	$12.40	$11.90
Heavy melt. steel, No. 2, east. Pa.	9.25	9.25	9.15	8.95
Heavy melting steel, Chicago	10.25	10.20	10.45	9.75
Rails for rolling, Chicago	11.25	11.05	11.55	11.25
Railroad steel specialties, Chicago	11.75	11.40	11.55	11.25

Coke

Connellsville, furnace, ovens	$3.60	$3.60	$3.60	$3.60
Connellsville, foundry ovens	4.60	4.60	4.60	4.60
Chicago, by-product foundry, del.	9.25	9.25	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.17c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.42c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.07c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.81c
New York, del.	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base con. (box) Pitts.	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.07c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½c
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

Pittsburgh	1.80c
Chicago or Gary	1.85c
Duluth	1.95c
Birmingham	1.95c
Cleveland	1.85c
Buffalo	1.90c
Detroit, delivered	1.95c
Pacific ports, f.o.b. cars, dock	2.35c
Philadelphia, del.	2.11c
Boston, delivered	2.22c
New York, del.	2.15c
Pitts., forg. qual.	1.95c-2.05c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	1.91c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.36c

Rail Steel

Straight lengths quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight or mixed carloads; pool cars, or less, 15c up. 10% dis. on nail extras on stright or mixed carloads to one consignee.)

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
do., 16 gage and finer	5.10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	1.95c
20,000 to 59,999 lbs.	1.90c
60,000 to 99,999 lbs.	1.85c
100,000 lbs. and over	1.82½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni. 1.05
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring base
6100 bars 1.20
6100 spring 0.70
Cr., Ni., Van. 1.50
Carbon Van. 0.95
9250 Carbon base plus extras

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23½-in.	
Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop,	
Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip,	
Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts.	
24-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$20.00
80-85 lbs.	$24.00
100 lbs.	$25.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll. qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs. up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage Bolts

All sizes, cut thread	70-10-5 off
Rolled thread, ½ x 6, smaller	70-10-5 off

Machine Bolts

All sizes cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts stud bolts	70-10-5 off
Tire bolts	60-5 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Rolled thread machine, ½ x 6, smaller	70-10-5 off
Step bolts	70-5 off
Elevator bolts	70-5 off

Nuts

S.A.E. semifinished hex.; ½ to ⅞-inch	70-10-5 off
Do., ½ to 1-inch	70-10-5 off
* Do., over 1-inch	70 off

Hexagon Cap Screws

Milled	85-10 off
Upset, 1-in., smaller	87½ off

Square Head Set Screws

Upset, 1-in., smaller	80 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila., to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Gal.
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel

2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel

½, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63

Iron

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east fdy.	43.00
Do., 4-in.	46.00

Class A pipe $3 over Class B. Stnd. fitgs., Birm. base...$100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.67
Duluth	31.00
Forging, Pitts., Chi. and Buffalo	32.00
Forging, Duluth	36.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	28.00

Slabs

Pitts., Cleve., Young.	27.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.70c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.60
Connellsville, fdry.	4.60
Connel. prem. fdry.	5.10
New River fdry.	6.00
Wise county fdry.	4.45- 5.25
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	9.20- 9.65
Chi., ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	11.00
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit ov., out. del.	8.50
Philadelphia, del.	9.03

Coke By-Products

Per gallon, producers' plants.

	Tank lots	Spot
Pure and 90% benzol	15.00c	
Toluol	30.00c	
Solvent naphtha	30.00c	
Commercial xylol	30.00c	

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	4.50c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	14.50	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
Delivered from Basing Points:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.08	.....	18.96	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.93	22.43	.....	.....
Brooklyn, N. Y., from Bmghm.	21.55	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.38	.....	19.40	.....
Cleveland from Birmingham	19.04	.....	18.92	.....
Indianapolis from Hamilton, O.	20.93	20.93	20.43	21.43
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.57	19.57	19.07	20.07
Muskegon, Mich., from Chicago, Toledo or Detroit	21.60	21.60	21.10	22.10
Newark, N. J., from Birmingham	20.61	.....	.....	.....
Newark, N. J., from Bethlehem	20.99	21.49	.....	.....
Philadelphia from Birmingham	19.93	.....	19.1	.....
Philadelphia from Swedeland, Pa.	20.31	20.81	19.81	.....
Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
Saginaw, Mich., from Detroit	20.75	20.75	20.25	20.25

Delivered from Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	19.00	19.00	18.50	.....
St. Louis from Birmingham	†18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

Low Phos

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $23.50. Phila. base, standard and copper bearing, $24.63.

Gray Forge		Charcoal	
Valley furnace	18.00	Lake Superior fur.	21.00
Pitts. dist. fur.	18.00	Do., del. Chicago	24.25
		Lyle, Tenn.	21.50

Silvery†

Jackson County, O., base; 6% $22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices, up $1.25.

Bessemer Ferrosilicon†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

First Quality.

Pa., Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	45.00
Second Quality	
Pa., Ill., Ky., Md., Mo., Ga., Ala.	40.00
Ohio	
First quality	$40.00-45.00
Intermediary	37.00
Second quality	28.00

Malleable Bung Brick

All bases	50.00

Silica Brick

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$45.00
Chemically bonded chrome brick	42.50
Magnesite brick	65.00
Chemically bonded magnesite brick	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$18.75-19.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$13.00-14.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsburgh	90.13
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicomang., 2½ carb.	90.00
2% carbon, 95.00; 1%,	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Ferrotungsten, stand., lb. cont. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous Prices

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead: New York	Lead: East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
June 1	9.00	9.12½	8.00	51.35	50.40	4.25	4.10	4.30	*19.00	12.75	35.00
June 3	9.00	9.12½	8.00	51.20	50.20	4.10	3.95	4.30	*19.00	12.75	35.00
June 4	9.00	9.12½	8.00	51.15	50.00	4.10	3.95	4.30	*19.00	12.75	35.00
June 5	9.00	9.12½	8.00	51.20	50.25	4.00	3.95	4.30	*19.00	12.75	35.00
June 6	9.00	9.12½	8.00	50.90	50.00	4.00	3.85	4.30	*19.00	12.75	35.00
June 7	9.00	9.12½	8.00	50.50	49.70	4.00	3.85	4.30	*19.00	12.75	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill basc, cents per lb. except as specified. Copper brass products based on 9.00c *Conn. copper.*

Sheets	
Yellow brass (high)	14.25
Copper, hot rolled	16.00
*Lead, cut to jobbers	7.75
Zinc, 100-lb. base	9.50
Tubes and Pipes	
High yellow brass	16.00
Seamless copper	16.25
Rods	
High yellow brass	12.75
Copper, hot rolled	13.25
Anodes	
Copper, untrimmed	13.75
Wire	
Yellow brass (high)	14.75

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
*New York	4.37½-4.62½
*Cleveland	4.50- 5.00
*Chicago	4.25- 4.50
*St. Louis	5.00- 5.25
Heavy Copper and Wire	
*New York, No. 1	5.75- 6.00
*Chicago, No. 1	5.75- 6.00
*Cleveland	5.25- 5.75
*St. Louis, No. 1	6.00- 6.25
Composition Brass Borings	
*New York	4.00- 4.25
Light Copper	
*New York	4.50- 4.75
*Chicago	4.25- 4.50
*Cleveland	4.25- 4.75
*St. Louis	5.00- 5.25
Light Brass	
*Chicago	2.25- 2.50
*Cleveland	2.50- 2.75
*St. Louis	2.50- 2.75
Lead	
*New York	3.00- 3.12½
*Cleveland	3.00- 3.25
*Chicago	2.75- 3.00
*St. Louis	3.40- 3.50
Zinc	
*New York	2.00- 2.25
Cleveland	2.12½-2.37½
St. Louis	2.65- 2.75
Aluminum	
*Borings, Cleveland	7.50- 8.00
*Mixed, cast, Cleve.	12.00-12.50
Mixed, cast, St. L.	13.00-13.25
*Clips, soft, Cleve.	13.50-14.00
SECONDARY METALS	
Brass ingott, 85-5-5-5	8.00
*Stand. No. 12 Alum.	15.75-17.00

Iron and Steel Scrap Prices

Corrected to Friday night Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	8.50- 9.00
Boston, dock, expt.	8.50
Boston, domestic	7.00- 7.25
Buffalo, No. 1	11.00-11.50
Buffalo, No. 2	9.50-10.00
Chicago, No. 1	10.00-10.50
Cleveland, No. 1	9.00- 9.50
Cleveland, No. 2	8.50- 9.00
Detroit, No. 1	8.00- 8.50
Detroit, No. 2	7.00- 7.50
Eastern Pa., No. 1	10.50
Eastern Pa., No. 2	9.00- 9.50
Federal, Ill.	8.00- 8.50
Granite City, R. R.	8.50- 9.00
Granite City, No. 2	7.25- 7.75
N. Y., deal, No. 2	7.00
N. Y., deal. barge	8.50
Pittsburgh, No. 1	12.25-12.75
Pittsburgh, No. 2	10.50-11.00
St. Louis	7.50- 8.00
Valleys, No. 1	11.50-12.00

COMPRESSED SHEETS

Buffalo, dealers	9.50-10.00
Chicago, factory	8.50- 9.00
Chicago, dealer	7.50- 8.00
Cleveland	8.00- 8.50
Detroit	8.50- 9.00
E. Pa., new mat.	10.00
Pittsburgh	12.25-12.75
St. Louis	6.25- 6.75
Valleys	11.00-11.50

BUNDLED SHEETS

Buffalo	7.00- 7.50
Cincinnati, del.	6.00- 6.50
Cleveland	6.00- 6.50
Pittsburgh	10.50-11.00
St. Louis	4.50- 5.00

SHEET CLIPPINGS, LOOSE

Chicago	6.00- 6.50
Cincinnati	5.50- 6.00
Detroit	5.00- 5.50
St. Louis	4.25- 4.75

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	13.00-13.50
Chicago (3 ft.)	12.50-13.00
Chicago (2 ft.)	13.00-13.50
Cincinnati, del.	11.00-11.50
Detroit	10.50-11.00
Pitts., open-hearth, 3 ft. and less	14.50-15.00
St. Louis, 2 ft.& less	12.00-12.50

STEEL RAILS, SCRAP

Boston	7.00- 7.25
Chicago	10.50-11.00
Pittsburgh	13.00-13.50
St. Louis	9.50-10.00

STOVE PLATE

Birmingham	5.75- 6.00
Boston, dealers	3.75- 4.00
Buffalo	9.25- 9.75
Chicago, net	6.00- 6.50
Cincinnati, dealers	5.50- 6.00
Detroit, net	5.75- 6.25
Eastern Pa.	8.50
N. Y., deal. fdry	6.00
St. Louis	5.50- 6.00

COUPLERS, SPRINGS

Buffalo	12.75-13.25
Chicago, springs	11.50-12.00
Eastern Pa.	13.50
Pittsburgh	14.50-15.00
St. Louis	8.50- 9.00

ANGLE BARS—STEEL

Chicago	13.00-13.50
St. Louis	9.50-10.00

RAILROAD SPECIALTIES

Chicago	11.50-12.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	12.75-13.25
Cleveland, billet, bloom crops	14.00-14.50
Eastern Pa., crops	13.00-14.00
Pittsburgh, billet, bloom crops	15.50-16.00
Pittsburgh, sheet bar crops	14.00-14.50

FROGS, SWITCHES

Chicago	10.00-10.50
St. Louis, cut	9.50-10.00

SHOVELING STEEL

Chicago	10.00-10.50
Federal, Ill.	7.50- 8.00
Granite City, Ill.	7.50- 8.00

RAILROAD WROUGHT

Birmingham	8.00- 8.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	9.50-10.00
Buffalo, No. 2	11.00-11.50
Chicago, No. 1, net	8.50- 9.00
Chicago, No. 2	10.00-10.50
Cincinnati, No. 2	7.50- 8.00
Eastern Pa.	10.50-11.00
N. Y., No. 1, deal.	7.25- 7.75
St. Louis, No. 1	6.50- 7.00
St. Louis, No. 2	8.25- 8.75

SPECIFICATION PIPE

Boston	3.00- 3.25
Eastern Pa.	9.00- 9.50
New York, dealers	3.50- 4.00

BUSHELING

Buffalo, No. 1	9.50-10.00
Chicago, No. 1	8.50- 9.00
Cinci., No. 1, deal.	6.00- 6.50
Cincinnati, No. 2	3.00- 3.50
Cleveland, No. 2	6.00- 6.50
Detroit, No. 1, new	7.00- 7.50
Valleys, new, No. 1	10.50-11.00

MACHINE TURNINGS

Birmingham	3.50- 4.00
Boston, dealers	2.00- 2.25
Buffalo	4.50- 5.00
Chicago	5.00- 5.50
Cincinnati, dealers	3.50- 4.00
Cleveland	5.00- 5.50
Detroit	4.50- 5.00
Eastern Pa.	6.00- 6.50
New York, dealers	2.50- 2.75
Pittsburgh	8.50- 9.00
St. Louis	2.25- 2.75
Valleys	8.25- 8.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	3.25- 3.50
Buffalo	6.00- 6.50
Cincinnati, dealers	3.50- 4.00
Cleveland	6.00- 6.50
Detroit	4.75- 5.25
Eastern Pa.	5.00
New York, dealers	1.50- 1.75
Pittsburgh	7.00- 7.50

CAST IRON BORINGS

Birmingham, plain	3.50- 4.00
Boston, chemical	5.50- 6.50
Boston, dealers	3.25- 3.50
Buffalo	6.00- 6.50
Chicago	5.00- 5.50
Cincinnati, dealers	3.50- 4.00
Cleveland	6.50- 7.00
Detroit	4.75- 5.25
E. Pa., chemical	11.00-12.00
New York, dealers	1.50- 1.75
St. Louis	2.00- 2.50

PIPE AND FLUES

Cincinnati, dealers	5.00- 5.50

RAILROAD GRATE BARS

Buffalo	7.50- 8.00
Chicago, net	6.00- 6.50
Cincinnati	4.00- 4.50
Eastern Pa.	8.50
New York, dealers	4.00- 4.50
St. Louis	4.50- 5.00

FORGE FLASHINGS

Boston, dealers	4.75- 5.00
Buffalo	9.50-10.00
Cleveland	8.00- 8.50
Detroit	7.00- 7.50
Pittsburgh	10.50-11.00

FORGE SCRAP

Boston, dealers	4.50- 4.75
Chicago, heavy	10.50-11.00
Eastern Pa.	9.50-10.00

ARCH BARS, TRANSOMS

St. Louis	10.00-10.50

AXLE TURNINGS

Boston, dealers	3.00- 3.50
Buffalo	7.50- 8.00
Chicago, elec. fur.	9.50-10.00
Cleveland	7.00- 7.50
Eastern Pa.	9.50
St. Louis	7.00- 7.50

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point.	10.00-10.50
Buffalo	12.50-13.00
Chicago, net	13.50-14.00
Eastern Pa.	16.00
St. Louis	12.00-12.50

SHAFTING

Boston, ship. point.	12.00-12.25
Eastern Pa.	17.00
New York, dealers	13.00-13.25
St. Louis	11.00-11.50

CAR WHEELS

Birmingham	9.00-10.00
Boston, iron deal.	5.25- 5.50
Buffalo, iron	11.00-11.50
Buffalo, steel	12.75-13.25
Chicago, iron	10.50-11.00
Chicago, rolled steel	11.00-11.50
Cincinnati, iron	8.00- 8.50
Eastern Pa., iron	11.00
Eastern Pa., steel	13.50
Pittsburgh, iron	12.50-13.00
Pittsburgh, steel	14.50-15.00
St. Louis, iron	8.00- 8.50
St. Louis, steel	10.50-11.00

NO. 1 CAST SCRAP

Birmingham	8.50- 9.50
Boston, No. 1 mach.	8.50- 9.00
Boston, No. 2	7.50- 8.00
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	10.75-11.25
Buffalo, mach.	11.50-12.00
Chicago, agri. net	7.50- 8.00
Chicago, auto	9.00- 9.50
Chicago, mach. net	9.50-10.00
Chicago, railr'd net	8.00- 8.50
Cinci., mach. cup.	8.50- 9.00
Cleveland, cupola	11.50-12.00
Detroit, net	9.50-10.00
Eastern Pa., cupola	11.00-12.00
E. Pa., mixed yard	8.50- 9.50
Pittsburgh, cupola	12.50-13.00
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	8.00- 8.50
St. L., No. 1 mach.	9.00- 9.50

HEAVY CAST

Boston, del.	5.25- 5.50
Buffalo, break.	8.50- 9.00
Cleveland, break.	7.50- 8.00
Detroit, No. 1, mach. net.	10.00-10.50
Detroit, break.	7.00- 7.50
Detroit, auto net	10.50-11.00
Eastern Pa.	10.50-11.00
N. Y., break. deal.	6.25- 6.75
Pittsburgh	11.50-12.00

MALLEABLE

Birmingham, R. R.	10.50-11.00
Boston, consum.	12.00-12.50
Buffalo	13.00-13.50
Chicago, R. R.	13.50-14.00
Cincinnati, agri. del.	8.50- 9.00
Cleveland, rail	12.00-12.50
Detroit, auto	10.00-10.50
St. Louis, R. R.	10.50-11.00
Eastern Pa., R. R.	11.00-11.50

RAILS FOR ROLLING

5 feet and over

Birmingham	10.50-11.00
Boston, dealers	8.00- 8.50
Buffalo	11.00-11.50
Chicago	11.00-11.50
Eastern Pa.	12.50-13.00
New York, dealer	7.50- 8.00
St. Louis	10.00-10.50

LOCOMOTIVE TIRES

Chicago (cut)	12.00-12.50
St. Louis, No. 1	9.00- 9.50

LOW PHOS. PUNCHINGS

Buffalo	12.50-13.00
Chicago	12.50-13.00
Eastern Pa.	13.00-14.00
Pittsburgh (heavy)	13.50-14.00
Pittsburgh (light)	13.00-13.50

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ores

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. low phos.	10.00
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish No. Africa basic, 50 to 60%	9.00
*Tungsten, spot, sh. ton unit, duty pd.	$15.50-16.00
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00-19.50

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

	STEEL BARS	IRON BARS	REINFORCING BARS	SHAPES	PLATES	NO. 10 BLUE	NO. 24 GALV. SHEETS	BANDS	HOOPS	NO. 24 BLACK	COLD FIN. STEEL	COLD ROLLED STRIP	TOOL STEELS	BOLTS AND NUTS
Baltimore*	2.95c	3.40c	2.60c	3.00c	3.00c	3.10c	4.30c	3.20c	2.30c	3.60c	3.58c			
Boston††	3.00c	3.31c	3.31c	3.20c	3.21c	3.30c	4.00c	3.30c	4.30c	3.95c	3.75c-3.90c			
Buffalo	3.00c	3.05c	2.10c-2.60c	3.25c	3.37c	3.62c	4.65c	3.42c	3.42c	3.25c	3.40c			
Chattanooga	3.31c	2.75c		3.56c	3.56c	3.36c	4.86c	3.61c	4.10c	4.21c	3.98c			
Chicago	2.95c	3.17c		3.20c	3.20c	3.05c	4.55c	3.30c	3.41c	3.85c	Chicago (h) 3.35c			
Cincinnati	3.17c	3.36c		3.42c	3.42c	3.22c	4.72c	3.47c	3.95c	4.07c	Cincinnati 3.57c			
Cleveland	2.95c	3.40c		3.31c	3.40c	3.11c	4.61c	3.36c	3.56c	3.91c	Cleveland (h) 3.35c			
Detroit	3.04c	2.98c		3.42c	2.98c	3.14c	4.72c		3.18c	3.94c	Detroit 3.49c			
Houston	3.00c	3.19c		3.00c	4.95c	3.35c	4.40c		3.20c	4.35c	Los. Ang.(f) (d) 5.70c			
Los Angeles	3.60c	3.25c		3.60c	3.15c	3.70c	4.95c		4.30c	3.96c	Milwaukee 3.46c			
Milwaukee	3.06c			3.31c	3.55c		4.66c		4.10c	3.89c	New Orleans 4.15c			
New Orleans	3.30c			3.55c	3.40c		4.50c		3.95c	3.60c	New York...3.81c-4.31c			
New York‡(d)	3.26c			3.37c	2.98c		4.50c		3.56c	3.60c	Philadelphia 3.61c			
Pittsburgh (h)	2.90c			3.15c	4.95c		4.30c		3.18c	3.60c	Pittsburgh 3.20c			
Philadelphia*	2.93c			2.98c	3.15c		4.30c		3.20c	3.55c	Portland (f) 5.85c			
San Francisco	3.60c			3.55c	3.55c		4.40c		4.25c	4.40c	San Fran.(f) (d) 5.80c			
Seattle	3.60c			3.55c	3.55c		4.40c		4.25c	4.40c	Seattle (f) (d) 5.85c			
St. Louis	3.19c			3.44c	3.44c		4.09c		3.54c	4.09c	St. Louis 3.59c			
St. Paul	3.00c			3.25c	3.25c		3.695c		3.20c	3.95c	St. Paul 3.05c			
Tulsa	3.25c			3.50c	3.50c		4.75c		3.45c	3.70c	Tulsa 4.50c			

Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	2.45c
St. Louis	3.24c
Tulsa	3.25c
Young.	2.30c-2.60c

Milwaukee	3.16c
New Orleans	3.55c
New York	3.31c
Portland	3.75c
Philadelphia*	3.08c
Pittsburgh(h)	2.95c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.29c
St. Paul	3.45c
Tulsa	3.70c

Pittsburgh(h)	3.70c
Portland	5.60c
San Francisco	6.15c
Seattle	5.60c
St. Louis	3.54c
St. Paul	3.75c

Chicago (a)	70
Cleveland	70
Detroit	70–5
Milwaukee	70
Pittsburgh	70

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif.; (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

TOOL STEELS (Applying on or east of Mississippi river; west of Mississippi 1c up)	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply

BOLTS AND NUTS (100 pounds or over)	Discount
Chicago (a)	70
Cleveland	70
Detroit	70–5
Milwaukee	70
Pittsburgh	70

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, June 6

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons	
			Quoted in dollars at current value	**Quoted in gold pounds sterling
PIG IRON	£ s d			£ s d
Foundry, 2.50-3.00 Silicon	$15.50	3 2 6	$13.83	1 14 0
Basic bessemer	15.50	3 2 6*	13.01	1 12 0
Hematite, Phos. .03-.05	15.62	3 3 0	.....	.....
SEMIFINISHED STEEL				
Billets	$27.28	5 10 0	$19.12	2 7 0
Wire rods, No. 5 gage	42.16	8 10 0	36.61	4 10 0
FINISHED STEEL				
Standard rails	$38.44	7 15 0	$44.74	5 10 0
Merchant bars	1.66c	7 10 0	1.15c to 1.20c	3 2 6 to 3 5 0
Structural shapes	1.63c	7 7 6	1.14c	3 1 6
Plates, †¼ in. or 5 mm.	1.77c	8 0 0	1.52c	4 2 6
Sheets, black, 24 gage or 0.5 mm.	2.04c	9 5 0	2.14c	5 16 0††
Sheets, gal., 24 gage, corr.	2.49c	11 5 0	3.22c	8 15 0
Bands and strips	1.88c	8 10 0	1.47c	4 0 0
Plain wire, base	2.04c	9 5 0	1.97c	5 7 6
Galvanized wire, base	2.38c	10 15 0	2.30c to 2.34c	6 5 6 to 6 7 6
Wire nails, base	2.65c	12 0 0	2.12c	5 15 0
Tin plate, box 108 lbs.	$ 4.46	0 18 2	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

		£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$16.74	3 7 6	(a) $17.13	260	$12.58	370	$25.53	63
Basic bessemer pig iron	16.74	3 7 6	(a)* 12.19	185	11.22	330	28.17 (b)	69.50
Furnace coke	4.09	0 16 6	7.91	120	3.74	110	7.70	19
Billets	27.28	5 10 0	28.34	430	18.36	540	39.11	96.50
Standard rails	1.82c	8 5 0	2.08c	694	1.65c	1,100	2.43c	132
Merchant bars	1.90c	8 12 0	1.68c	560	.90c	600	2.02c	110
Structural shapes	1.93c	8 15 0	1.65c	550	.90c	600	1.98c	107.50
Plates, †¼-in. or 5 mm.	2.00c	9 1 3	2.10c	700	1.13c	750	2.34c	127
Sheets, black	2.32c	10 10 0§	2.10c	700‡	1.24c	825‡	2.65c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.87c	13 0 0	3.81c	1,270	2.25c	1,500	6.81c	370
Plain wire	2.04c	9 5 0	3.39c	1,130	1.65c	1,100	3.18c	173
Bands and strips	2.07c	9 7 0	1.95c	650	1.26c	840	2.34c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel a del. Middlesbrough. b hematite. ††Close annealed

**Gold pound sterling carries a premium of 67 per cent over paper sterling.

Bars

Bar Prices, Page 66

Pittsburgh—Quotations of 1.80c, base, Pittsburgh, on carbon steel bars and 2.45c, base, Pittsburgh, on alloy steel bars are firm. Demand from automotive consumers is growing lighter.

Cleveland—A few contracts for steel bars covering third quarter requirements have been booked on the basis of 1.85c, Cleveland. Prices apparently are steady, but demand is tending downward, and tonnage from any one source is insufficient to provide a real test. Specifications from automobile manufacturers, agricultural implement and tractor builders and others are considerably lighter than last month.

Chicago—Lighter demand from the automotive industry is largely responsible for a further decrease in steel bar sales and specifications. Orders from farm implement manufacturers and miscellaneous consumers are holding well.

Boston—Incoming business has declined considerably, but consumers are buying what they actually need without questioning prices, which are held at recent code levels. Screw machine products continue to lead in demand which is not brisk. Small-lot business in alloy bars is fair.

Philadelphia—While new buying is off, commercial steel bar specifications have been fairly sustained, although largely miscellaneous in character.

Youngstown, O.—Makers of steel bars are pleased at the encouraging volume of new business and specifications that continue to come to them from a wide variety of sources. Prices are unchanged.

Plates

Plate Prices, Page 66

Pittsburgh — When the Mississippi Valley Barge Lines Co., Cincinnati, issues an inquiry for 30 steel barges this week, it will mark the largest inquiry of this nature on the rivers in many months; in fact, since the projected purchase of 24 barges by Commonwealth Edison Co., Chicago. Size of the barges for the Mississippi Valley Barge Lines Co. is not yet determined, but the project probably will require 4000 to 6000 tons of steel plates. Inquiry of the American Oil Co., Baltimore, for six to eight welded barges for use in this district has been revised in the respect that the Pan-American Oil Co. will do the purchasing. However, American Oil Co. is in the process of buying some seven vertical steel floating-top tanks and 19 horizontal tanks for erection at Hays, Pa. Gulf Refining Co., Pittsburgh, will close bids through its marine department in New York June 10 for two 130 x 32 x 7-foot steel barges, according to revised inquiry.

Cleveland—Rumors of lower prices on one or two small lots of plates apparently are unfounded, as sellers here during the week booked orders at the full market price, 1.99½c, delivered, Cleveland, and at 1.80c, base, Pittsburgh. The market is quiet, consumers having little to offer.

Chicago — Prospective plate business is accumulating but orders recently have continued at their previous quiet rate. A large tonnage will be required for the Chesapeake & Ohio railroad freight cars, while lock and dam construction on the Mississippi river and other public projects under the federal work-relief program will require large lots. Requirements of railroads for equipment repairs continue light.

Boston—There has been surprisingly little pressure for lower plate prices and sellers report 2.22c, Boston, firm. The Holyoke, Mass., pipe fabricating shop will require 1375 tons of plates, for 40-inch water pipe for the metropolitan district commission. Except for this award, buying is largely in small lots for miscellaneous needs.

New York—A substantial tonnage of plates will be required for a $1,200,000 refinery project for Russia, the fabrication contract having been placed with Alco Products Inc., New York, by the Amtorg Trading Corp. Several other oil company tonnages are pending, and better interest is being shown in public utility projects, but these have not developed to an active tonnage stage. Consumers generally are sounding out the market, but, except where tonnage is needed for immediate requirements, have placed little. Producers appear firm in their prices.

Pittsburgh—Pittsburgh-Des Moines Steel Co., Pittsburgh, is reported to have booked several hundred small, 500-gallon tanks for the Standard Oil Co. of New Jersey, each tank requiring about half a ton of steel.

Philadelphia — Plate tonnage continues restricted. Several large projects are pending and consumers generally are manifesting interest in prices. However, little new buying is developing. A recent development has been a revival of certain utility projects, including some gasholder work. Since the supreme court's decision on NIRA there has been more interest than at any time in months, although most of this work appears in a tentative stage, for plate sellers report little definite inquiry. Recently noted ship tonnages continue pending. Little railroad business is in sight.

Youngstown, O.—Plate mills continue to run spasmodically, depending upon the size of incoming orders. While there are some wide plate orders for 50 to 200-ton lots the narrower widths appear to be more in demand. Prices continue steady.

San Francisco—The only plate award of the week went to Steel Tank & Pipe Co., 550 tons for a 20 and 28-inch welded pipe line for Mammoth Hot Springs, Wyo., for the national park service. The American Concrete Pipe Co., which obtained the Eureka, Calif., pipe line project on a reinforced concrete, plate lined basis will require 1300 tons of light gage plates for liners. Long Beach, Calif., has approved plans and will call for bids soon for six 85,000-barrel tanks, aggregating 21,500,000 gallons, requiring close to 5000 tons of material.

Seattle—Some new business of importance is contemplated but is not yet definite. Immediate projects require only small tonnages. There is a fair volume in light gages for tank work and small boiler jobs. United States engineer, Portland, Oreg., will receive bids June 25 for construction of a 117-foot steel survey boat, single screw, diesel-electric drive, estimated to cost $200,000. Steel tonnage is unstated.

Contracts Placed

3350 tons, three 2,000,000-gallon water tanks, Buffalo, to Chicago Bridge & Iron Works, Chicago, on low bid of $475,000.

1375 tons, 9450 feet, 40-inch steel water pipe, metropolitan district commission, Boston, to Walsh's Holyoke Steam Boiler Works, Holyoke, Mass.; Coleman Bros. Corp., Boston, general contractor at $190,226.20, bids May 16. Installation at Medford, Mass.

550 tons, 20 and 28-inch welded pipe, national park service for installation at Mammoth Hot Springs, Wyo., to Steel Tank & Pipe Co., Berkeley, Calif.

155 tons, 500,000-gallon elevated tank, University of Illinois, Urbana, Ill., to Chicago Bridge & Iron Works, Chicago.

120 tons, two molasses tanks, Federal Yeast Corp., Baltimore, to Graver Tank & Mfg. Co., East Chicago, Ind.

Contracts Pending

5000 tons, six tanks, aggregating 21,500,000 gallons, Long Beach Calif.; plans approved and bids soon.

1300 tons, 24-inch reinforced concrete pipe, plate lined, Eureka, Calif.; general contract to T. E. Connolly, San Francisco.

100 tons, water stops, metropolitan water district, Los Angeles; Consolidated Steel Corp., Los Angeles, low.

Unstated tonnage, preliminary estimate 4000 to possibly 6000 tons, 30

steel barges for Mississippi Valley Barge Lines Co., Cincinnati.
Unstated tonnage, three 300-cubic yard steel dump scows, United States engineer, Philadelphia, bids July 5.
Unstated, 117-foot survey boat; bids by United States engineer, Portland, Oreg., June 25.

Sheets

Sheet Prices, Page 66

Pittsburgh—Sheet users appear to be buying more cautiously than before the invalidation of NRA. While a few buyers are persistently circulating "feelers" in the form of inquiries for attractive tonnages, the majority of sheet buyers are paying the going market, with sheet extras also firmly applied. Sheet mill operations were lower last week for common black and galvanized grades, but full finished production expanded from 54 to 61 per cent. Activity among jobbing mills was steady at close to 35 per cent.

Cleveland—Some sheet buying for fall automobile models is expected in July. Meanwhile specifications from automobile manufacturers are tending downward. Makers of household equipment, such as washing machines and refrigerators, also are reducing the size and number of their orders. Some inquiries have been received for sheets for delivery during the remainder of the year, whereas the steel code limited sales to the quarter. Reports are heard of users offering to buy at lower prices—10,000 tons, in one instance—but makers discount these as merely efforts to sound out the market. Prices are steady.

Chicago—Sheet demand continues quiet, orders being less active in nearly all directions. The automotive industry accounts for a large share of the decline in bookings, though many consumers have curtailed inventories and are ordering entirely for prompt needs. Prices are being held steadily at code levels.

Boston—Uncertainty continues as to what the future will develop on prices, but evidence indicates no business has been placed or quoted below the recent code quotations. Buying, however, is light with the demand for cold finished slightly ahead of others.

New York—Sheet tonnage continues restricted to consumers' immediate necessities. Since the Steel code became invalid producers have held firmly on prices, and developments of the past few days have confirmed their intention of maintaining a stable market. Third quarter inquiry to date has been met with quotations recently announced for that delivery. One early public opening involves about 700 tons of automobile license tag stock for New York state, with bids to be in June 17. Other early openings include 192 tons of sheets for the navy June 14 and 502 tons June 21.

Philadelphia—Approximately 35,000 to 40,000 tons of sheets will be required shortly for a contract just placed with the Edward G. Budd Mfg. Co., Philadelphia, by Chevrolet. This will be the first large inquiry in the open market. The steel will be needed for frames for passenger cars and trucks, and is understood to be comprised mainly of hot rolled material in gages approximating, if not actually, plate sizes.

Washington—Bureau of supplies and accounts, navy department, will close June 11, schedules 5213 and 5249, on 272 tons of sheets for various yards, including 196 tons of cold rolled for Mare Island, Calif.

Buffalo—Sheet mills in this district are operating at about 70 per cent, and may curtail production before the end of the month.

Youngstown, O.—Sheet consumers are watching the market closely and are confining their new business to current requirements. They admit unconfirmed rumors are drifting around of alleged price concessions as certain purchasers employ these tactics to obtain price concessions. Valley makers in reply are pointing to the American Iron and Steel institute pronouncement of several days ago, and in seeking to maintain the former code prices they are receiving almost hourly endorsements of their stand from important purchasers. District mills are continuing operations at fairly satisfactory rates at around 55 to 60 per cent.

Cincinnati—Sheet mills in this district announce prices are being maintained. A lull in miscellaneous demand is less pronounced than in automotive specifications. A leading interest is operating galvanized sheet departments at capacity.

St. Louis—Slowing tendencies in new ordering and shipments are reported by producers and distributors of steel sheets in this area. The weather has been unfavorable, holding back building operations and other activities in which sheets are used.

Seattle—Lack of construction work is affecting the demand for sheets. Orders for galvanized have declined. This is attributed to the strike in the lumber industry which has interfered with pending and prospective work.

Cold Finished

Cold Finished Prices, Page 67

Pittsburgh—Numerous consumers' requirements for cold-finished steel are being purposely held up at this time in view of market uncertainties. Producers of cold-finished bars are firm in quoting the full market price plus usual extras and consumers, in the main, are maintaining a waiting attitude. The market on cold-drawn carbon bars is 1.95c, base Pittsburgh.

Transportation

Track Material Prices, Page 67

Some relatively small rail buying is being done but no large tonnages are in the market. Grand Trunk Western has placed 8450 tons with Illinois Steel Co. and Inland Steel Co., Chicago, and the Pere Marquette 1000 tons with Inland Steel Co. Seattle city officials have opened bids on 1000 tons of relaying rails for the city's railroad to its light plant at Rockport, Wash.

A total of 9135 tons of rails will be required for relaying tracks in the Muskingum, Ohio, conservancy district, for which general contract bids are being taken to June 20. These include 6950 tons for the Wheeling & Lake Erie and 2185 tons for Baltimore & Ohio. Specifications from the United States engineers' office, Zanesville, O., state general contractors are to make the awards.

The Pennsylvania will open bids June 18 under the Clayton act on nominally 5000 tons of plates, shapes, bars, pipe, pig iron and various other routine quarterly requirements. Other carriers are expected in the market shortly for similar needs.

Only two freight cars were placed with builders in May, bringing the total for five months to 1182. Comparisons follow:

	1935	1934	1933	1932
Jan.	24	152	3	159
Feb.	806	19,725	0	35
March	0	30	5	105
April	350	800	50	0
May	2	717	8	60
5 Mo.	1 182	21,424	66	419
June		1,835	500	0
July		19	306	25
Aug.		105	202	5
Sept.		7	23	1,298
Oct.		75	514	0
Nov.		254	533	2
Dec.		110	316	50
Total		23,829	2,460	1,739

White Motor Co., Cleveland, has booked an order for 125 school buses for Children's Bus Service Inc., New York, totaling about $350,000, said to be the largest order for school buses ever placed.

Rail Orders Placed

8450 tons, Grand Trunk Western, to Illinois and Inland Steel companies, Chicago.
1000 tons, Pere Marquette, to Inland Steel Co., Chicago.

Car Orders Pending

United States engineer, St. Paul, four

flat cars and 48 storage trucks, bids June 14, schedule 191.

Locomotives Pending

Chief of engineers, war department, Washington, one 18-ton gasoline, mechanical drive locomotive, bids June 7.

Buses Placed

White Motor Co., Cleveland: 125 school buses, 35-passenger, for Children's Bus Service Inc., New York.

Pipe

Pipe Prices, Page 67

Pittsburgh — A pipe line from here to Harrisburg, Pa., for Atlantic Refining Co., Philadelphia, has been awarded to National Tube Co., Pittsburgh. The order, which involves about 180 miles of 8-inch line pipe, will require some 14,500 to 15,000 tons of pipe and marks the first sizable line pipe project placed in this district this year. Last week a small line pipe project for an unstated customer in Michigan was awarded to a Pittsburgh independent steel pipe maker. A large amount of oil refining equipment including boiler, cracking, and condenser tubes will be required by Alco Products Inc., subsidiary of American Locomotive Co., in connection with a $1,250,000 order for the Soviet government. Most of the order will be filled at the company's Dunkirk, N. Y., division.

Chicago—Cast pipe inquiries continue slow and some delays still are encountered in placing of orders sponsored by federal funds. The largest of recent contracts is 1000 tons for the Stickney, Ill., sewage disposal plant of the Chicago sanitary district. Shipments against old contracts continue fairly active, being relatively heavier than new business. A steady volume of small-lot orders is appearing from private users.

Boston — Cast pipe buying and inquiry continues disappointingly light. A few orders are being placed, but inquiry has been below expectations, due in part to the slow release of public works funds for water line projects. Merchant steel pipe demand is steady in small resale lots. Wrought pipe, except for a small inquiry for Boston, on which bids are in, is not active.

New York — Delays in allotments and approval of funds under the public works program are holding back considerable cast pipe inquiry. The city closes this week on 413 tons of pipe for delivery at the Bronx storage yard, also on 310 tons of water department castings. Prices on small odd-lot business making up

FROM TOP TO BOTTOM OF PACK

only 15° temperature variation

ABOVE: *Battery of annealing furnaces for handling black plate for tinning; also pickled and annealed stock.*

Another view of two of the Rust Box Annealing Furnaces built for the Wheeling Steel Corp., Wheeling, W. Va., by Rust Furnace Co.

PERFORMANCE DATA*

TEMPERATURE DIFFERENTIAL: 15° F. (approximately).

MAXIMUM FIRING RATE: 2600 cu. ft. natural gas per hour.

WEIGHT OF BOXES AND BOTTOMS: 17000 lbs. (approximately).

WEIGHT OF CHARGE: 68000 lbs. (approximately).

NATURE OF CHARGE: Black plate for tinning; also pickled and annealed stock for various purposes.

TEMPERATURE RISE: To bring the furnaces up to 1500° F. only eight hours are needed.

*Data supplied by Wheeling Steel Corp., Wheeling, West Virginia, for which furnaces were built.

. . . And that's only one advantage of these **RUST** *Box Annealing Furnaces insulated with Nonpareil Brick*

THERE'S no worry about uneven heating with this battery of gas-fired annealing furnaces, built for Wheeling Steel Corporation's plant at Wheeling, West Virginia, by the Rust Furnace Company, of Pittsburgh. Insulated throughout with Armstrong's Nonpareil Brick, the furnaces have a temperature differential of less than 15° F.

Heat is held in by 13½ inches of No. 2 fire brick backed up with 4½ inches of Nonpareil Brick on sidewalls, and 9 inches of No. 2 fire brick backed up with 4½ inches of Nonpareil Brick on the roof. Only eight hours are required to bring these box annealing furnaces up to 1500° F. This means a substantial fuel saving.

Nonpareil Insulating Brick is designed for use up to 1600° F., and Armstrong's Insulating Brick is recommended up to 2500° F. Armstrong's EF Brick combine insulating and refractory qualities for temperatures up to 2475° F. These light-weight insulating fire brick are used directly exposed except in cases of extreme abrasion or where slagging action is present.

For samples and complete information about all three types of Armstrong's Brick, write Armstrong Cork Products Company, Building Materials Division, 985 Concord Street, Lancaster, Pa.

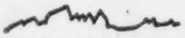
Armstrong's

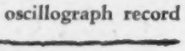
HIGH TEMPERATURE PRODUCTS

Armstrong's - **EF** - *Nonpareil*

THE ARC THAT SHOWS UP IN THE SHOW DOWN

You'll find out more about arc welder performance from the oscillograph record than you can learn otherwise in a month of Sundays.

When it looks like this: 
you have the varying heat intensity that means lack of uniform strength in welds.

P&H-Hansen's oscillograph record looks like this: 
That's why you weld faster, more effectively with P&H-Hansens. They make welding easier, reduce the dependence on human skill.

Before you buy your next welder, examine comparative oscillograph recordings. You will find the key to strong dependable welds.

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Bulletin HW-3 gives you "The Inside Story". Ask for it.

Models range from 50 to 800 ampere capacity.

P&H HANSEN ARC WELDERS

Cast Pipe Placed

1000 tons, including fittings, sewage disposal plant, Stickney, Ill., for Chicago sanitary district; 400 tons to James B. Clow & Sons, Chicago, balance to Chicago producer.

400 tons, 6 and 8-inch universal, Grand Junction, Colo., to Central Foundry Co., Birmingham, Ala.

328 tons, 2 to 8-inch, Fountain Green City, Utah, to Pacific States Cast Iron Pipe Co., Provo, Utah.

311 tons, 2 to 8-inch, Parowan, Utah, to Pacific States Cast Iron Pipe Co., Provo, Utah.

250 tons, Santaquin, Utah, to Pacific States Cast Iron Pipe Co., Provo, Utah.

250 tons, 12-inch and under, Grasslands hospital, Westchester county, New York, to United States Pipe & Foundry Co., Burlington, N. J.

250 tons, 12-inch and under, Bloomfield, N. J., to United States Pipe & Foundry Co., Burlington, N. J.

143 tons, Emerytown, Utah, to Pacific States Cast Iron Pipe Co., Provo, Utah.

100 tons, 6-inch, class 150, Eureka, Calif., to American Cast Iron Pipe Co., Birmingham, Ala.

Unstated tonnage, 11,000 feet of 8-inch, Marquette, Mich., to McWayne Cast Iron Pipe Co., Birmingham, Ala.

Unstated tonnage, 3600 tons of 6 and 8-inch, Kaukauna, Wis., to James B. Clow & Sons, Chicago.

Steel Pipe Placed

14,500 tons, approximately, 180 miles of 8-inch, line from Pittsburgh to Harrisburg, Pa., for Atlantic Refining Co., Philadelphia, to National Tube Co., Pittsburgh.

Cast Pipe Pending

350 tons, 16-inch, for Seattle extension; bids in.

220 tons, 16-inch, Heber, Calif.; bond election for water system, July 2.

206 tons, 20-inch, outfall sewer, San Mateo, Calif.; bids June 17.

203 tons, fittings for 3 to 24-inch pipe, Chicago; bids June 11.

158 tons, 4 and 6-inch, Santa Monica, Calif.; bids in.

145 tons, 2 to 6-inch, Kamas, Utah; bids in.

118 tons, 4 to 8-inch, class 250 or B, Inglewood, Calif.; bids June 10.

Unstated tonnage, 2400 feet of 4-inch and 5200 feet of 6-inch, Waldo, Wis.; bids soon.

Unstated tonnage, pipe and valves, Fort Peck, Mont.; bids in.

Steel Pipe Pending

Unstated tonnage, probably several thousand, 16-inch, for hydraulically filling a dam at Clinton, Mass.

MORE THAN 45 YEARS ON THE JOB ... the first one we ever built!

It's the first of its kind ever completely built in the Harnischfeger shops where the trimotored electric crane was pioneered. 45 years on the job and still going strong!

Since then we've learned a heap about building cranes to meet the demands of American industry. You can't find a crane problem that P&H engineers haven't already licked. That's why, as America's foremost builder, P&H has the experience and facilities to give you what you need . . . when you need it.

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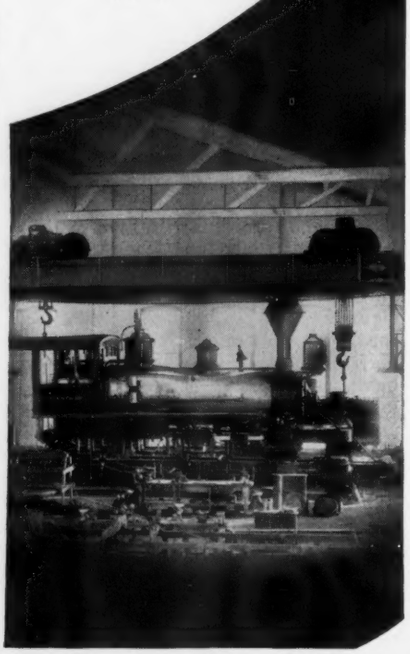

40-ton crane in Union Pacific Shops at Cheyenne; built in 1890.

P&H TRAVELING CRANES

Shapes

Structural Shape Prices, Page 66

New York—Bids on the New York tunnel approach and plaza, Hudson river tunnel to Weehawken, N. J., taking 2500 tons of structural shapes were postponed one week to June 13. The following day 6200 tons for the Henry Hudson bridge superstructure go in. Bids will be taken June 7 on 8950 tons of shapes, including 3800 tons of silicon bronze, for the approach to the Triboro bridge, New York. Awards are light. Included in projects being withdrawn by the federal government are a number of eastern postoffices, one at Rochester, N. Y., due to have closed June 25. Considerable other work is being delayed by the elimination of certain code requirements first placed in specifications.

Pittsburgh—The market of 1.80c, base, Pittsburgh, on plain structural shapes is firm, in spite of the fact fabricated and erected structural prices are irregular. Jones & Laughlin Steel Corp., Pittsburgh, has been awarded 2025 tons for the medical center building at New Orleans, and American Bridge Co., 2300 tons for the bascule span at Chicago. Leading among new inquiries is a 1700-ton building at Washington for the Acacia Life Insurance Co.

Cleveland—Seven structural projects being figured by Cleveland fabricators, including three industrial jobs, require 5500 tons. This includes 2300 tons for 11 railroad bridges in the Muskingum, Ohio, conservancy district, on which bids are being taken to June 20 by the United States engineer, Zanesville, O. Ohio has been allotted $7,670,815 for highways and $8,439,897 for grade eliminations in the federal works relief program.

Chicago — Structural awards are the smallest for the year to date, but fairly large tonnages are pending and specifications for plain material against old contracts are well maintained. Low bidders have been announced on 9000 tons of piling for the Ft. Peck, Mont., dam. Bids were received on two units of this project and combined bids of two companies on each of these units is less than that of the contractor who submitted a low lump bid on both sections. Bids on several public projects received since the NRA termination have been returned unopened, and some uncertainty attends the immediate outlook for such work.

Boston — Structural demand continues sluggish with awards of several hundred tons, including 225 tons for a dormitory at Hartford, Conn. Improvement in bridge requirements is slow. Maine is taking figures on a 300-ton span at Hallowell.

Philadelphia — No outstanding structural awards are noted, and while some fair size jobs still are contemplated, no immediate action appears likely. Fabricated material prices continue highly unsettled, but shape prices are steady.

San Francisco—Structural lettings declined, less than 700 tons being placed. The outstanding award went to Pacific Coast Steel Corp., 350 tons of joists for the Southern Pacific-Key System crossing in Oakland,

Shape Awards Compared

	Tons
Week ended June 8	5,406
Week ended June 1	6,440
Week ended May 25	15,356
This week 1934	14.705
Weekly average, 1934	16,284
Weekly average, 1935	14,207
Weekly average, May	11,525
Total to date, 1934	406,264
Total to date, 1935	326,778

MYSTERY PLANE

Taking off unannounced, the TWA robot-controlled transport air-liner recently set a new mark of 11 hours, 5 minutes, from Los Angeles to New York, clipping ½ hour from the previous transcontinental record.

ULTRA-CUT STEEL

as the "Ace" of fast-cutting screw stocks, shows equally surprising performance in the industrial field. When it is substituted for standard grades of free-cutting steel in fabricating duplicate parts, the speed of automatic screw machines may be stepped up 30% to 40% or more, producing more parts per hour without sacrifice of quality.

The threaded connector, shown at right, was turned out at a rate of 80 pieces per hour with Ultra-Cut versus 55 per hour with SAE 1112. Note also that the count per tool grind was 2200 with Ultra-Cut against 1100 with SAE 1112.

Test B & L Ultra-Cut on your machines, and you will gain a new conception of modern cutting speeds, besides having the satisfaction of beautifully finished products. B & L engineers will welcome the opportunity of cooperating with you in bettering your production. Ask for Ultra-Cut Folder No. 3-A.

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Calif. Bids will be called for soon for a transmission line for the metropolitan water district, Los Angeles, involving 6500 tons.

Seattle—This market is the most active of any in the Pacific Northwest. The week's awards exceeded 1000 tons, while business pending approximates 12,000 tons. Pacific Coast Steel Corp., San Francisco, is understood to have been given the contract for two 168-foot steel trusses, Bonneville, Oreg., dam, calling for 455 tons. Bids will be opended June 25 by the army engineer, Portland, Oreg., for seven intake gates, nine sections of steel draft tube stoplogs, 19 steel gates and four gantry cranes, lifting beams, etc.,

Shape Contracts Placed

2025 tons, 14-story building, School of Medicine, Louisiana state university medical center at Charity hospital, New Orleans, to Jones & Laughlin Steel Corp., Pittsburgh, at $165,400. Caldwell & Hart, New Orleans, have contract for construction of piling and foundation at $167,850.

455 tons, two 168-foot truss spans, Bonneville, Oreg., dam, to Pacific Coast Steel Corp., San Francisco.

350 tons, joists, Southern Pacific-Key System crossing, Oakland, Calif., to Pacific Coast Steel Corp., San Francisco.

330 tons, warehouse, Louisville, Ky., for Brown & Williamson Co., to McClintic-Marshall Corp., Bethlehem, Pa.

230 tons, building for electric light plant, Rochester, Minn., to Lakeside Bridge & Steel Co., Milwaukee.

225 tons, dormitory, Mt. St. Joseph college, West Hartford, Conn., to Standard Structural Steel Co., Hartford.

220 tons, building, Fulton, N. Y., for Kohler-Swiss Choclate Co., to McClintic-Marshall Corp., Bethlehem, Pa.

200 tons, crusher plant Coulee, Wash., dam, to Isaacson Iron Works, Seattle.

200 tons, four cable towers, Coulee, Wash., dam, to unidentified fabricator.

170 tons, bridge, Hornell, N. Y., to Lackawanna Steel Construction Corp., Buffalo; H. E. Bunce, Hornell, general contractor.

140 tons, pumping station, Washington, to Ingalls Iron Works Co., Verona, Pa.

140 tons, six separators, Baton Rouge, La., to Petroleum Iron Works Co., Sharon, Pa.

135 tons, steel for screens, inquiry 6-8489-GXL, Pennsylvania railroad, to Cornell Iron Works, New York.

130 tons, steelwork for Mohawk dam, Warsaw, O., Muskingum conserving district, to American Bridge Co., Pittsburgh.

125 tons, tunnel equipment, Coulee, Wash., dam, to Isaacson Iron Works, Seattle.

120 tons, alterations, building 14, Owens-Illinois Co., Pennsylvania, to Frank M. Weaver & Co. Inc., Lansdale, Pa.

111 tons, bridge, Lancaster county, Nebraska, to St. Joseph Structural Steel Co., St. Joseph, Mo.

100 tons, Benjamin Franklin school, Long Beach, Calif., to Virginia Bridge & Iron Co., Roanoke, Va.

Shape Contracts Pending

9000 tons, piling, Ft. Peck, Mont., dam; Spillway Contractors Co., Kansas City, Mo., low for general contract.

8950 tons, including 3800 tons silicon bronze, approach to Triboro bridge, New York; contract No. 88; bids June 27; also, 111 tons cast steel; 75 tons malleable, cast steel, cast iron and wrought iron in the drainage system and railing; 3200 pounds of copper and aluminum.

6500 tons, transmission towers, metropolitan water district, Los Angeles; bids soon.

6300 tons, stoplogs, gates and four gantry cranes, Bonneville, Oreg., dam project; bids to United States engineer, Portland, Oreg., June 25.

5000 tons, steel sheet piling, Tennessee valley authority, Knoxville, Tenn.; bids postponed from June 3 to 17.

2500 tons, tunnel approach and plaza, New York side, midtown Manhattan-Weehawken, N. J., Hudson river tunnel; bids postponed from June 6 to 13 by port of New York authority.

1750 tons, building, Acacia Life Insurance Co., Washington.

1500 tons, power house, Coal Creek, Tenn., for Tennessee valley authority, Knoxville, Tenn.

1400 tons, radial gates, Wheeler dam, Sheffield, Ala.

1020 tons, Norris power plant, Tennessee valley authority, Knoxville, Tenn.; bids June 26.

750 tons, Liberty tubes plaza, Pittsburgh; John F. Casey Co., Pittsburgh, low on general contract bids of June 4.

Behind the Scenes with STEEL

Prelude

Before anyone tries to pin us down as to why we're here, we state our reasons once and for all:

STEEL'S happy (?) family of readers totals about 50,000. They deserve to know what is going on not only in their industry but in their industry's paper, which is STEEL of course. That will be our job—to show you behind the scenes each week—to let you enjoy our laughs, share our troubles and help wrestle with our problems.

We should have a lot of fun together. Although somewhat limited in space we shall try to air any of your kicks or comments and give our slant on them as well. In other words, you'll find us a combination safety valve, mail bag, private detective, dopester, and perhaps in our own inimitable way—a humorist.

* * *

Can You Afford Not To. . .

A question that STEEL will endeavor to answer over the next several months is, "Can you afford not to re-equip your plant along modern lines?"

There is no blanket answer of "yes" or "no" because of the many factors to be taken into consideration. The extensive survey now underway will be reviewed in coming issues and culminate in a general summary in September preceding the Machine Tool and Metal shows.

The theme is "Focusing Attention on Modernization." Don't miss any of these interesting articles (see p. 34).

* * *

Rabid Readers

Our presses have been humming lately reprinting articles appearing in regular issues. A heat-treating story brought an order for 11,000 reprints; an automobile manufacturer distributed to every dealer 4000 copies of an article on its all steel body; a Syracuse manufacturer placed an order for overruns of the April 22 "Mirrors of Motordom"; a Philadelphia company took 100 extra copies of the April 22 issue; E. L. Shaner's editorials are constantly being reprinted and a week barely passes before the issue is exhausted by requests for extra copies.

* * *

Motordom's Mirrors

It seems we'll soon have to order more filing cabinets to hold the letters received commending "Mirrors of Motordom." The latest one, from the president of a large radiator company, reads:

I enjoy reading STEEL *very much and there is one page I read religiously—that is "Mirrors of Motordom".*

In the same mail a well-known V. P. tells us:

I have noticed for some time that "Mirrors of Motordom" has about the most accurate information available on the automotive industry.

That's swell, but what we would like to know, Mr. V. P., is why the "about"? Why not go the whole hog like one of our New York admirers who congratulates us for "the most outstanding magazine feature of its kind in the country"?

* * *

Open-Hearth Bill

Bill Buell's saga of open-hearth furnace design is now in the stretch run, and is attracting all sorts of attention from superintendents, melters and others active in open-hearth practice. The current series is the concluding portion of a trilogy. If you're interested, we'll be glad to let you have the first two sections of this work free with a year's subscription.

You'll have to hurry though, for requests for these earlier chapters are coming thick and fast.

* * *

Fastest Growing

Recent comparative questionnaires by leading manufacturers clearly show STEEL *to be the fastest growing industrial publication in the country. We knew this, of course, but now they have gone and told everyone!*

—SHRDLU

560 tons, Bayou St. John bridge, Hammond-New Orleans highway, Baton Rouge, La.; Doullet & Ewin Inc., New Orleans, general contractor.
500 tons, Allegheny county home, Woodville, Pa.; W. F. Trimble & Sons Co., Pittsburgh, awarded general contract.
380 tons, nurses home addition, Sea View hospital, Staten Island; Rosoff Bros., low.
350 tons, building, Joslyn Mfg. Co., Ft. Wayne, Ind.
300 tons, Merrimac river highway bridge, Missouri.
300 tons, bridge, Yazoo river, near Yazoo City, Miss.; Missouri Valley Bridge & Iron Co., Leavenworth, Kan., low, $237,704.
300 tons, state highway bridge, Hallowell, Me.
240 tons, bridge over Honker Cut, Stockton, Calif.; bids opened.
175 tons, factory building, Marshfield, Wis.
150 tons, state girder bridge, Wenatchee river, Wash.; general contract to Elliott & Co., Seattle; also 32 tons of bars.
125 tons, addition, Hugh M. Browne junior high school, Washington; bids June 18.

Reinforcing

Reinforcing Bar Prices, Page 67

New York—Small-lot buying of reinforcing steel is well sustained, but contracts for 100 tons or more are few. Bids on more than 1100 tons required for the Hudson river tunnel to Weehawken, N. J., were postponed to June 17. P. T. Cox Contracting Co., New York, will place about 1700 tons for grade crossings Staten Island, probably among several sellers. While billet steel reinforcing bar prices are holding, there is a report that a substantial tonnage of rail steel bars for a mid-west dam project brought prices well under the recent code quotations.

Pittsburgh—Award of a substantial tonnage of new billet steel reinforcing bars for the oil-distributing depot at Hays, Pa., being projected for American Oil Co., Baltimore, is expected momentarily. Although American Oil Co. has revived plans for buying six or eight steel barges so that purchasing will be done by the Pan-American Oil Co., an affiliate, the loading and unloading facilities, buildings, tanks, etc., are being bought by American Oil Co.'s headquarters at Baltimore. Reflecting irregularities in the price of some grades of reinforcing material, it is reported that a recent order for rail steel bars to be used in one of the government's conservancy district dams was closed at a price $2 a ton under the former code market for rail steel material. The new billet bar market is firm and unchanged at 2.05c, base, Pittsburgh, for cut lengths in carload quantities.

Cleveland—Small lots of reinforcing bars were placed at unchanged prices. The market is not active, and except for work in the Muskingum, Ohio, conservancy district, fabricators have little tonnage to figure. Approximately 2500 tons of reinforcing bars are expected to be awarded for the various bridges and dams in the Muskingum district this month. J. L. Hunting Co., Cleveland, is low bidder for the general contractor for the administration building at Cleveland's easterly sewage disposal plant, requiring 270

Concrete Awards Compared

	Tons
Week ended June 8	4,742
Week ended June 1	4,981
Week ended May 25	5,422
This week in 1934	9,677
Weekly average, 1934	4,084
Weekly average, 1935	4,974
Weekly averae, May	3,837
Total to date, 1934	119,443
Total to date, 1935	114,400

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tons of reinforcing bars and 150 tons of shapes.

Chicago—Concrete bar awards are heavier, recent orders totaling about 3200 tons. Largest of these is 1000 tons for the Waukegan, Ill., sewage disposal plant, while 1425 tons has been placed for Chicago sanitary district work and 250 tons for a meat packing plant building here. Closing on these jobs removes most of the large tonnages pending recently, with fabricators looking to the work relief program to bolster business during the summer.

Boston—Highway and bridge requirements pending are estimated at less than 200 tons. Small-lot buying holds to the recent rate, but new tonnage projects for early action are lacking.

Philadelphia—As a result of changes being made in the originally contemplated method of proceeding under the new public works program, local reinforcing bar sellers look for delay in the development of projects requiring bars in this district. Some sellers now look for the tendency to be away from large projects where there will be an unusual expenditure for materials and toward work requiring the utmost in the way of labor. Certain sellers, however, expect much of the grade crossing elimination work to go ahead as contemplated.

San Francisco—More than 1100 tons were placed during the week. Pacific Coast Steel Corp. took the largest award, 400 tons for the Hall of Records, Fresno, Calif. Indications point toward improvement in demand from private sources. The largest pending project calls for 2450 tons for an outfall sewer in Los Angeles, up for bids July 2.

Seattle—Demand for concrete reinforcing materials is slack. Awards include 103 tons for the Succor creek unit of the Owyhee, Oreg., dam.

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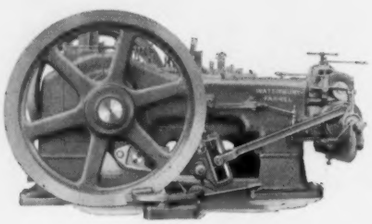

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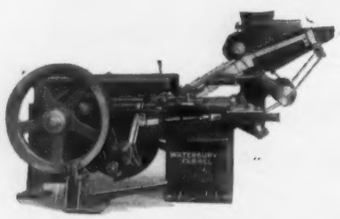

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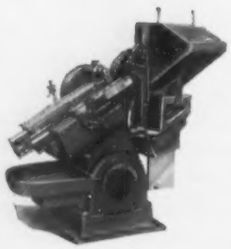

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Reinforcing Steel Awards

1000 tons, sewage disposal plant, Waukegan, Ill., to Concrete Steel Co., Chicago.

750 tons, sewer unit No. 3, Chicago sanitary district, to Inland Steel Co.; S. A. Healey Co., Chicago, general contractor.

700 tons, rail steel, Mohawk dam, Muskingum, Ohio, conservation district, United States engineer project, Zanesville, O., to Sweets Steel Co., Williamsport, Pa.; George M. Brewster & Son Co., Begota, N. J., general contractor.

675 tons, pumping and blower building, Stickney, Ill., sewage disposal plant for Chicago sanitary district, to Concrete Steel Co., Chicago; M. J. Boyle & Co., Chicago, general contractor.

564 tons, bridge, Will county Illinois, to Olney J. Dean & Co., Chicago; E. J. Albrecht Co., Chicago, general contractor.

400 tons, Hall of Records, Fresno, Calif., to Pacific Coast Steel Corp., San Francisco.

250 tons, plant building, Wilson & Co., Chicago, to Inland Steel Co., Chicago.

200 tons, four attendants' quarters, state hospital, Camarillo, Calif., to unnamed interest.

103 tons, Succor creek unit, Owyhee, Oreg., dam project, to unnamed interests; Morrison-Knudsen Co., Boise, Idaho, general contractor.

100 tons, courthouse, Bozeham, Mont., to unnamed interest.

Reinforcing Steel Pending

575 tons, bridge over Verdugo wash at Del Balle avenue, for Los Angeles county, California; bids soon.

235 tons, piers, Bronx and Bronx Kills spurs, Triboro bridge, New York; Tully & Di Napoli Inc., Long Island City, N. Y., low, $395,525, bids June 3.

185 tons, Bayou St. John bridge, Hammond-New Orleans highway, Baton Rouge, La.; Doullet & Ewin Inc., New Orleans, general contractor.

148 tons, including 62 tons of shapes, bureau of roads bridge at Selway, Idaho; bids in.

105 tons, Girl's high school, San Francisco; Dinwiddie Construction Co., San Francisco, low for general contract.

100 tons, warehouse, for United States Paper Co., Los Angeles; bids opened.

100 tons, state bridge Chelan county, Washington; bids in; Butler Construction Co., Seattle, low.

Strip Steel

Strip Prices, Page 67

Pittsburgh—Quotations of 1.85c, base, Pittsburgh, for hot-rolled strip steel, and 2.60c, Pittsburgh or Cleveland, base, for cold-rolled strip, applied firmly and unchanged on sales last week. Strip producers continue to operate under former code provisions and practices.

Cleveland—Hot and cold rolled strip orders were placed during the week at unchanged prices, including some business from Chevrolet and other General Motors units. Some makers reported a slightly better volume of specifications from automobile manufacturers than in the preceding week.

Chicago—Strip buying continues in small lots for early requirements and although the volume has been fairly steady, a rather marked decrease is apparent in comparison with first quarter. Producers have indicated intentions of continuing recent prices and these levels have been well maintained. Inventories of consumers are restricted, necessitating placing of frequent orders.

Boston—Cold-rolled strip prices are unchanged at 2.80c, Worcester, with some decline in buying. Some producers of cold narrow strip have lost customers of long standing to slit sheets.

Philadelphia—Narrow strip prices are steady, notwithstanding efforts in some consuming quarters to obtain lower prices, particularly for third quarter. New orders at the moment are being confined to immediate requirements.

Youngstown, O.—Volume of specifications as well as new business in hot and cold-rolled strip has dropped off somewhat in the past week, but mills continue to receive satisfactory total tonnages of specifications from auto partsmakers and miscellaneous users. Most important consumers possess small stocks, and seek prompt shipments both for wide and narrow strip. Quotations are declared steady.

Wire

Wire Prices, Page 67

Pittsburgh—Further caution dominates buying by users of wire products, but the price schedule is firm at recent levels, finding plain manufacturers' wire quoted 2.30c, base, Pittsburgh, nails, $2.60, and fencing, $63 per base column.

Cleveland—Specifications for manufacturers' wire show a further decline, but demand for fencing material is steady. Producers are holding firmly to established prices.

Boston—A few scattered instances of pressure for lower wire prices have brought no concessions and the slight decline in buying is to the degree buyers are cautiously awaiting developments. The recession in orders, however, is small as users of manufacturers' wire, which is the most active, are operating with light stocks. Demand for specialties is steady.

Chicago—Wire demand is holding better than had been anticipated considering the uncertainty created by the recent NRA decision. Buying of manufacturers' wire usually is in small lots for early needs, but consumption is well maintained. Automotive demand is quieter and a further recession is expected. Improvement in fencing demand has appeared following announcement of fall dating terms, with further gains anticipated shortly. Prices of wire and wire products are well maintained.

Philadelphia — Agricultural demand for wire is being well sustained. Manufacturers' needs are restricted. Meanwhile, sellers are

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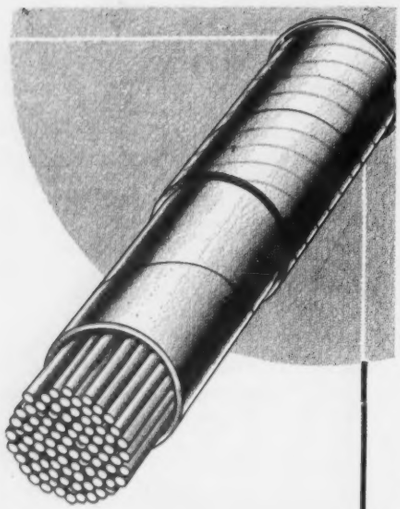

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Wilkes-Barre, Pa.—Hazard Wire Rope Co., Wilkes-Barre, has been awarded the contract for wire rope hawsers by the bureau of supplies and accounts, navy department, at $96,784.20, delivered, bids May 31.

Pig Iron

Pig Iron Prices, Page 68

Pittsburgh—Struthers Iron & Steel Co. lighted its Anna furnace at Struthers, O., June 3 after five years of idleness, resumption having been made possible by a $350,000 RFC loan. The company is resuming on basic, foundry, and malleable grades and will postpone production of low phos iron. The pig iron market in this district has not been disturbed by recent invalidation of the steel code. Producers, however, are booking little more than carload lots, at $18, base, Pittsburgh district furnace, for basic; $18.50, base, on foundry grades, and $19 for bessemer iron.

Cleveland—Pig iron sales continue to be made on the basis of $18.50 for No. 2 foundry, Cleveland, Toledo and Detroit. Consumers have not asked for price concessions, but are not buying far ahead, and no contracts have been reported covering third quarter. As melters' stocks are low, purchasing is expected to be fairly steady in small lots for several weeks, and tend to stabilize prices. After three months in which shipments from Cleveland district furnaces varied only fractionally from month to month, the movement shows a definite decline, specifications from automobile, agricultural and heating apparatus manufacturers being lighter, and indicating a drop in production for June.

Chicago—Pig iron shipments are fairly steady, deliveries so far this month showing little change from those of the corresponding May period. With lighter operations in prospect among some consumers, however, June shipments are expected to show a small decrease. Operations of the farm implement industry continue a bright spot, generally being steady. Tractor manufacturers are particularly active. Prices are held firmly at $18.50, furnace, for No. 2 foundry and malleable.

Boston—With stocks of foreign iron in storage heavier than usual and being sold from 50 cents to more than $1 a ton under domestic iron, producers of the latter face keener price competition than ever. Dull demand and meager buying have operated against any tendency to meet this competition. General Electric Co. has inquired for 400 tons for its Lynn, Mass., plant. Imports of pig iron here last month totaled 2823 tons, 305 tons being Indian and the remainder Dutch iron. Bureau of supplies and accounts, navy department closes June 25 on 160 tons of foundry pig iron, 54 tons of which is for Boston.

New York—Pig iron specifications are spotty, but prices are steady.

Philadelphia—Impending strike in the bituminous coal industry has to date caused little immediate concern among pig iron consumers. Most consumers, except principally pipemakers, have little stock on hand, but their attitude is that producers have sufficient supplies to cover needs for the time being. Domestic producers, reaffirm intention of extending prevailing prices.

Buffalo—More iron is moving by canal and lake to replenish storage stocks. Barges are available at low cost because of the scarcity of grain cargoes and shippers are taking advantage of this situation to move iron in large volume.

Youngstown, O.—Buyers of pig iron are continuing to exercise caution in placing orders in that immediate needs only are being filled and these usually in small lots of foundry and malleable grades. Quotations are firm, and sellers report no requests for price concessions.

Cincinnati—Furnace interests announce adherence to current pig iron quotations and in some cases, at least, to code contracting conditions. Fresh buying is close to recent levels and for early needs only. Shipments are virtually without suspensions, indicating all iron on second quarter contract will have been moved by July 1.

St. Louis—New business and shipments are temporarily light. Consensus of opinion is that, with NRA uncertainties disposed of, the market will move ahead. It is felt definitely blast furnace interests have no intention to revise prices in either direction. The melt as a whole is holding up well, seasonal recession in certain quarters being offset by new miscellaneous business being placed with jobbing foundries and some other plants.

Birmingham, Ala.—Production and shipments have been about equal in foundry iron, five furnaces being in blast while three others are on basic and one on recarburizing irons. Three blast furnaces are scheduled to blow out next week.

Toronto, Ont.—While the holiday Monday had some effect on sales in the pig iron markets, business again is showing improvement with new orders appearing at regular intervals. Local blast furnace representatives state business generally is well ahead of that for the corresponding period of last year.

Scrap

Scrap Prices, Page 69

Pittsburgh — A weaker tone last week was caused by declines in ingot operating rates of most local consumers. No. 1 heavy melting steel continues to be quoted here at a range of $12.25 to $12.75, based on the last sales, but some brokers appear willing to sell at $12 a ton. Machine shop turnings are off 25 cents a ton to $8.50 to $9, and heavy cast scrap is also off 25 cents. Borings and turnings for blast furnace use are up 50 cents on the strength of a $7.50 consumer purchase.

Cleveland—While the New York Central railroad has closed on its scrap list, it is believed that only a moderate proportion of the material offered was sold. Buyers generally are cautious and watchful in making commitments either directly or through brokers. Shipments for the most part include miscellaneous grades.

Chicago—Scrap buyers and sellers are marking time. While consumption is fairly steady, mills remain out of the market pending clarification of the immediate outlook. Prices have an easier tone due to virtual completion of shipments against higher priced orders, and brokers have lowered their bids.

Boston — Domestic demand for scrap is light with prices somewhat easier for delivery at New England consuming points, including Worcester, where the buyer is offering $8, delivered, for No. 1 heavy melting steel. Machine turnings for Pennsylvania have brought close to $2.50, f.o.b. Most activity continues for boat loading. Prices at docks are firm.

New York — Although domestic scrap buying continues light, a fair-sized tonnage has been sold for Buffalo delivery, shipments having started via the barge canal. Most of this was No. 2 scrap for which $7, dock, is being paid. Small shipments of breakable cast, some from this district, have moved to Harrisburgh, Pa., at $10.25, delivered.

Philadelphia — Scrap prices reflect strength, following uncertainty of the preceding week. One eastern Pennsylvania consumer has advanced prices on a middle grade of No. 2 steel 50 cents a ton and is paying 25 cents or more higher than a few days ago to some dealers for stove plate. Edward G. Budd Mfg. Co. here received an increase of approximately 25 cents a ton over last month for its regular accumulation of special compressed sheets. Reflecting strength in compressed sheets, ordinary grades have been advanced to $10, delivered, consumer's plant, to represent the only change in the regularly listed prices.

Buffalo — A mixed trend is being shown in scrap. While one local consumer has paid $10 for No. 2 heavy melting steel another offers only $10.50 for No. 1 material, whereas the usual spread between the two grades is $1.50. There have been no tonnage sales at the $10.50 offer for No. 1 but on the other hand the $10 offer for No. 2 is now believed to have been withdrawn.

Detroit—An easier tone is evident in iron and steel scrap but as yet it has not lowered the general market below the level of $8.50 to $9 for hydraulic compressed sheets and $8 to $8.50 for No. 1 steel. Automotive offerings have declined slightly and are expected to fall off rapidly over the next two months. Accumulations on dock and yards continue heavy. Melters generally are aloof from the market.

Youngstown, O.—Consumers of iron and steel scrap and brokers are marking time and buying is quiet.

Seattle—The market is inactive. Pittsburgh base prices for export materials are more nearly on a par with the Pacific coast market, but Japan still is hesitant. Offers from that section are uninteresting to local dealers and no new business is reported closed. Recent shipments, under old commitments, have been heavy and include three full cargoes of 7500 tons each, taken by foreign bottoms on a freight basis of $3.75 a ton.

Cincinnati — Inactivity in iron and steel scrap here caused erasure of a recent 50-cent increase in price and even at lower quotations dealers are disinclined to a long position. Possibility of any tonnage buying by mills in this district within 30 days are considered slim.

St. Louis — The market for iron and steel scrap continues quiet, with prices showing virtually no changes.

Birmingham, Ala.—Steel and iron scrap appears listless, consumers buying only as their needs warrant and then in small tonnage.

Toronto, Ont.—Trading in iron and steel scrap was slow during the early part of the week but dealers look for early improvement. Hamilton mills are taking delivery of heavy melting steel. Turnings, however, are moving slowly in small tonnages.

Semifinished

Semifinished Prices, Page 67

Semifinished steel demand continues to show a slightly downward trend. Wire rod, skelp, and billet

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specifications are not sufficient to balance the lower volume of sheet and tin bars at present. On transactions last week, sheet bar users were buying on the basis of $28, Pittsburgh, while the billet market was $27, Pittsburgh, and common wire rods $38.

Warehouse

Warehouse Prices, Page 70

Pittsburgh—Volume of warehouse steel sales is slowly declining against a peak set in March for some jobbers and in April for others.

Cleveland—Warehouse prices are firm, and no efforts are being made by consumers to break the market.

Detroit—Warehouse business in iron and steel has been little affected by general events of the past two weeks. While prices are now in a free market, they are steady and unchanged.

Chicago—Sales are steady and continue better than a year ago. May sales showed little change from those of April and only a moderate decrease is in prospect for June.

Boston — Structural shapes have been reduced slightly out of warehouse in line with a recent freight rate adjustment. Volume holds to last month's pace with buying well scattered.

New York—Volume with jobbers holds to the recent rate. Buying is well spread, mainly small, but fairly numerous orders. Prices are firm.

Philadelphia—While tonnage last month was fairly sustained, jobbers have noted a sharp decline since the first if the month. Prices are unchanged.

Cincinnati — Prices of steel from warehouse are apparently well maintained and without announced changes during the past week. Demand has tapered slightly.

St. Louis — Sales by warehouses are well maintained with demand well spread over various products.

Metallurgical Coke

Coke Prices, Page 67

By-product coke requirements of the Struthers Iron & Steel Co.'s merchant blast furnace at Struthers, O., are being supplied with coal furnished by the Hillman interests of Pittsburgh, and coked at the Aliquippa, Pa., works of Jones & Laughlin Steel Corp. It is estimated that coke shipments will run to about 15,000 tons monthly.

By-product coke shipments at Chicago are fairly steady. Prices are unchanged. Cincinnati ovens feel some increased demand as protection against mining trouble and resulting shortage. St. Louis sellers have felt the effect of high rivers closing consuming plants.

Ferroalloys

Ferroalloy Prices, Page 68

New York—Sellers of ferromanganese and domestic spiegeleisen continue to adhere to prices which have prevailed for many months and which recently were reaffirmed for third quarter. Shipments have slowed up, but not to the extent indicated a fortnight or so ago. Ferromanganese is $85, duty paid, Atlantic and Gulf ports; and domestic spiegeleisen, 19 to 21 per cent, $26, Palmerton, Pa., on quantities up to 50 tons, and $24 on 50 tons and over.

Pittsburgh—An inquiry for 1500 tons of washed gravel domestic fluorspar is current from a Mahoning valley steelmaker, for delivery over June, July, and August. The market, f.o.b. Illinois or Kentucky mines, remains firm on the basis of $13, per net ton, in carloads, for rail delivered fluorspar, or $14.50, same basis, for barge deliveries.

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Tin Plate

Tin Plate Prices, Page 66

Pittsburgh—Capacity mill warehouse stocks of tin plate are now beginning to move against delayed canmakers' shipping directions. Tin plate producers are able to schedule rolling mills at about 75 per cent. Prices are firm.

Youngstown, O. — Tin plate mills in this district are continuing satisfactory operating rates. Canners are about to make their usual crop survey, which has been delayed about a month later than usual by adverse weather, and then they plan to place orders for the remainder of the season.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 67

Since bolt and nut producers have opened books for third quarter at 70-10-5 off list, few consumers have negotiated contracts for that delivery. Bolt and nut producers are now generally granting an extra 10 points for carload quantities of bolts and nuts to jobbers. The third quarter market on large rivets is 2.90c, Pittsburgh or Cleveland, 3.00c, Chicago, and small rivets, 70-5 off list.

Semifinished hexagon nuts in both

S.A.E. and U.S.S. standards, over 1 inch, have been advanced to 70 off list, from 70 and 5 off.

At Cleveland specifications from practically all sources are lighter.

Iron Ore

Iron Ore Prices, Page 69

Cleveland—Small lots of iron ore have been sold for one or two merchant blast furnaces recently blown in, but most of the buying in the open market has been completed, and allotments made to steel companies by their associated iron ore interests. There is nothing important in view in the sales picture until fall. Pig iron stocks are not excessive, and no blast furnace will go into the winter short of iron ore. If the public works program develops a strong iron and steel demand this year, this would be reflected in ore shipments. At present producers are rather disappointed that only 3,903,857 tons have been shipped from the upper lake ports so far this year. The May shipments totaled 3,503,795 tons. The Lake Superior Iron Ore association reports the following shipments from upper lake ports, representing totals for the season to June 1:

	To June 1, 1934	To June 1, 1935
Escanaba	171,747	273,700
Marquette	240,344	319,559
Ashland	195,087	565,246
Superior	989,867	1,333,006
Duluth	648,529	951,173
Two Harbors	385,004	461,173
Totals	2,630,578	3,903,857

New York—Two cargoes of low phosphorus ore are being figured on by importers here for mid-western furnace. This is the first substantial inquiry for this ore to come before the trade in some time, although there are one or two other inquiries being tentatively figured for shipment in the fall. Foreign iron ore prices generally are firm.

Nonferrous Metals

Nonferrous Metal Prices, Page 68

New York—Most nonferrous metals maintained price steadiness last week despite general uncertainty in business. Lead was an exception, however, by dropping $5 per ton.

Copper — Custom smelters and mine producers continued to hold prices firm at 9.00c, Connecticut, while in the outside market metal was available down to 8.00c, f.o.b. refinery. Copper prices abroad dropped below 8.00c, c.i.f.

Lead—Sales were fair following the $2 cut in prices, bringing the open market down to 4.00c, New York, and 3.85c, East St. Louis. St. Joseph Lead quoted 10 points higher and was therefore well out of the market.

Zinc—Prices held steady at 4.30c, East St. Louis, despite light sales.

Tin—Straits tin prices moved fractionally under the influence of exchange rate fluctuations. New demand was light.

Antimony—Sales were light with prices unchanged on the basis of 12.75c, duty paid New York, for Chinese spot.

Aluminum—Quotations held unchanged at 19.00c to 21.00c for ninety-nine per cent plus.

Steel in Europe

Foreign Steel Prices, Page 70

London—(*By Radio*)—Most steelworks in Great Britain have well filled order books. Demand is largely domestic, with export trading small. Pig iron from India is competing with the domestic product in the British market. Imports of steel products are practically absent as the quarterly quota has been reached in most lines, notably semifinished steel. Negotiations for completion of the Anglo-European steel cartel are continued actively. Galvanized sheet exports are quiet, but tin plate is brisk.

Brussels and Berlin report export trade slightly better. French export trade is dull and domestic demand is light.

Equipment

Pittsburgh — Excepting the usual volume of small-sized inquiry for steel mill equipment repairs, the market has reverted to dullness. Shop work is proceeding here on the blooming mill contracts which Mackintosh-Hemphill Co. has for Inland Steel Co. and Jones & Laughlin Steel Corp. Other leading equipment builders are likewise booked up for at least the next three months.

Chicago — While the recent code restraint on building of additional iron and steel making facilities now is lifted, definite plans for new open-hearth construction are lacking. Activity in equipment markets is fairly steady, but machine tools were quieter the past week both in orders and inquiries. Part of the slowness is attributed to the new uncertainty growing out of the NRA collapse. Additional machinery for the new diesel engine plant of the Electro-Motive Corp. here is expected to be placed within a few weeks.

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1947

business is being done with models developed within the last year or more, largely of the automatic type and embracing new design features. Some of the larger builders have fair backlogs of government needs. Prices on machine tool equipment are firm. Sellers are hopeful that some business already figured and held in abeyance for some time, will be revived with the codes dropped.

New York—A fairly widespread, but still limited demand continues for industrial plant equipment with such orders rarely for more than one or two units at a time. The Philadelphia district, notably for government shop needs, is more active than the New York territory. For the navy, bids closed this week on 20 tools for Philadelphia, mostly milling machines.

Seattle—Public works projects are calling for important orders of heavy equipment, while mining operations in Alaska continue to create a demand for machinery and tools. Much equipment is required for the gravel washing and concrete mixing plant at Coulee dam, expected to be in operation Sept. 1. Spokane equipment dealers report a 50 per cent increase in volume compared with a year ago.

Construction and Enterprise

Illinois

ALTON, ILL. — Engineering Construction Corp., 10 East Fortieth street, New York, has been awarded contract for construction of dam No. 26 in the Mississippi river at a cost of $4,865,717.

CHICAGO—Cromwell Paper Co., 4821-29 South Whipple street, plans to build a $100,000 annex, 101 x 270 feet, to its plant.

CHICAGO—Intag Co., 2528 West Forty-eighth place, is planning to install motors and controls, conveyors and other equipment in new two-story printing ink manufacturing plant. Cost is estimated at $100,000.

CHICAGO—Schott Brewery Products Inc., 2560 South Halsted street, has been incorporated to engage in brewery business, by Luke Daw, Ellen Daw and John Daw. Correspondent: Thomas C. Donovan, Markman, Donovan & Sullivan, 125 West Madison street.

CHICAGO—Duplex Tool Co., 7530 Greenwood avenue, has been incorporated by Louis C. Berman, Ralph Bloch and Noah Fox, to manufacture jacks, lifting, pulling and pushing devices. Correspondent: Brown, Fox & Blumberg, 2059 Continental Illinois Bank building.

CHICAGO—H. E. Lacy Mfg. Co., 844 West Jackson boulevard, has been incorporated to deal in metal specialties, fountain equipment and electrical devices, by H. E. Lacy, Robert Lobban and Fred W. Gehrer. Correspondent: Daniel A. Wolf, 188 West Randolph street.

CHICAGO—Illinois Lock Co., 737 West Jackson boulevard, has been incorporated by Malcolm R. McNeill, Raymond K. Gray and William F. Orth, to manufacture locks and locking devices. Correspondent: McKinney, Lynde & Grear, 105 Adams street.

CHICAGO—Central Welding Works Inc., 3711-15 Milwaukee avenue, has been incorporated to engage in general body auto repair business, by Frank Haas, John Sramek and Melvin Henecke. Correspondent: David L. Apfelbaum, 134 North LaSalle street.

CHICAGO—Lowe Hillsman Co., 612 North Michigan avenue, has been incorporated by G. F. Lowe, G. E. Hillsman and Clara Lowe, to deal in engineering and hardware specialties, machinery appliances and accessories, gasoline and gas engines and motors. Correspondent: Walter R. Titzel Jr., 30 North LaSalle street.

Indiana

KOKOMO, IND.—Kingston Products Corp., manufacturer of automobile parts, toys, and radios, plans to build a new wing to its plant here. The addition will add 35,000 square feet of floor space.

SOUTH BEND, IND. — Bantam Ball Bearing Co. has placed a contract with Platz & Gill, South Bend, Ind., for an addition to its plant. The new unit will enlarge the company's floor space 60 per cent, and is in line with a general expansion program based on the assurance of sharply increased bearing orders from automotive, steel, machine tool and allied industries. In addition to increased floor space the company has recently augmented its mechanical facilities for the handling of machining, heat treating and grinding by over 50 per cent and further developments are being planned in this connection.

Michigan

DETROIT — Pros't Brewing Co., 9737 Knodel street, will spend approximately $60,000 for erection of a bottling plant, to be completed and machinery installed by July 1.

LANSING, MICH.—Lakeland Refinery Inc., 1207 City National Bank building, recently organized, plans to install motor and controls, pumping machinery, transformer equipment, etc., in new local oil refining plant. Cost about $100,000.

NORTHVILLE, MICH. — Ford Motor Co., Dearborn, Mich., plans installation of motors and controls, electric hoists, conveyors, etc., in new engine valve manufacturing plant here. Cost is estimated at close to $90,000. Giffels & Vallet Inc., Marquette building, Detroit, architect and engineer. (Noted May 6)

Pennsylvania

NEW KENSINGTON, PA. — Plant of State Construction Co., Fifth street near Second avenue, was severely damaged by fire May 30, including considerable loss to machinery, supplies and machine shop equipment.

PITTSBURGH—Jones & Laughlin Steel Corp. storehouse, South side plant, Carson and Twenty-seventh streets, was slightly damaged by fire May 31.

ERIE, PA.—Two large freight docks here of the Pennsylvania railroad were completely demolished by fire June 1.

New York

NORTH TONAWANDA, N. Y.—National Grinding Wheel Co. will erect

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a 2-story factory building, 80 x 100 feet, and is taking bids on the contract. Plant will be of steel, reinforced concrete and brick.

SALAMANCA, N. Y. — Luminite Products Corp. has placed contract for a factory building here with the Benz Engineering Co., Salamanca, N. Y. (Noted May 27)

JAMESTOWN, N. Y.—Jamestown Steel Partitions Inc. has been formed to manufacture metal partitions. The company has taken over the former plant of the Wright Metal Co. Emil N. Johnson is president.

New Jersey

NEWARK, N. J.—A major share of the $500,000 appropriation to be spent by the Pittsburgh Plate Glass Co., Grant building, Pittsburgh, for plant modernization and equipment at its various branches, will be expended at the company's plant here.

Connecticut

BRANFORD, CONN.—Atlantic Wire Co. plans immediate construction of four additional buildings, including two warehouses.

Massachusetts

NORTH GRAFTON, MASS.—Atlas Yeast Corp. plans installation of motors and controls, conveyors and other equipment in connection with proposed rebuilding of portion of plant recently damaged by fire.

Alabama

PELL CITY, ALA.—City has preliminary survey made by J. W. Goodwin engineer, Birmingham, Ala., for installing sanitary sewerage system, costing about $37,000.

Maryland

CUMBERLAND, MD. — Celanese Corp. of America, 180 Madison avenue, New York, and Box 444, Cumberland, Md., is contemplating erection of auxiliary units, and may let contract for units and machinery before fall.

ELKTON, MD. — Plant of Victory Fireworks & Specialty Co. here was severely damaged by an explosion June 4.

District of Columbia

WASHINGTON — United States marine corps will take bids June 12, schedule 763, for locomotive crane for installation at Parris Island, S. C.

WASHINGTON — Washington Gas Light Co. is planning a $644,027 expansion program this year. E. J. Boothby is vice president and general manager.

WASHINGTON—Department of interior, national park service, room 1031, Navy building, will take bids June 12, for installing an air conditioning system in the east and west wings of the administration building of the United States department of agriculture.

Georgia

GLENNVILE, GA.—Glennville Ice Co., W. G. McCurty manager, will probably rebuild its burned plant.

Mississippi

JACKSON, MISS.—United States Corrugated Box Co., H. J. Lacy president, Indianapolis, will establish a plant across the river from Jackson in Rankin county. A building 150 x 400 feet will be erected and modern machinery installed.

TUNICA, MISS.—Planters Tractor & Implement Co. is planning to erect a building for the manufacture of farm equipment. E. L. Mathershed, Lula, Miss., is contractor.

Florida

PANAMA CITY, FLA.—Standard Oil Co. of Kentucky, W. Edwin Glossop construction engineer, Louisville, Ky., has been granted permit for immediate construction of docks, tanks, offices and warehouses here. Cost is estimated at $100,000.

North Carolina

WINSTON-SALEM, N. C.—Bahnson Co., manufacturer of humidifiers and air-conditioning equipment, has let contract for 3-story addition to its plant on South Marshall street. Work is under way.

WILMINGTON, N. C.—Taylor-Colquitt Co., Spartanburg, S. C., has acquired the wood preserving plant of the North State Creosoting Co., here, and will make improvements to mechanical equipment, including erection of storage tanks with capacity of 1,000,000 gallons of oil.

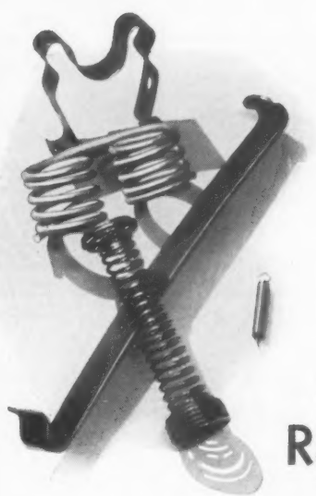
South Carolina

FLORENCE, S. C.—Wood Products

(*Please turn to Page* 87)

RAYMOND

Springs



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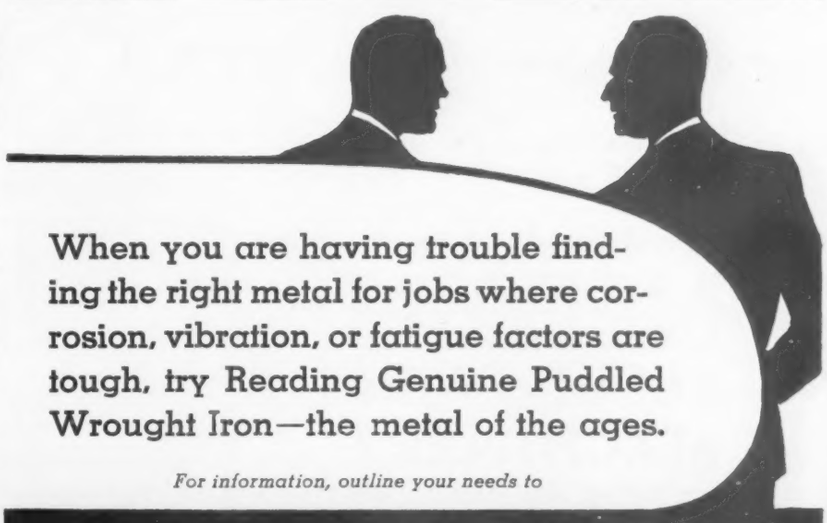

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ESTABLISHED 1892
EXCELSIOR TOOL & MACHINE CO
EAST ST. LOUIS, ILLINOIS.
INCORPORATED 1902

(*Continued from Page* 85)

Mfg. Co. has been formed with $50,000 capital by E. P. Warner and D. V. Richardson, to operate a woodworking plant.

FORT MILL, S. C. — City, Luther G. Patterson mayor, has applied for loan and grant of $41,200 for light and power distributing plant.

SUMMERVILLE, S. C.—William Ahrens is planning to establish a broom works and will install broom-making machinery and equipment.

Tennessee

CHATTANOOGA, TENN. — Nixon-Hasselle Co. Inc., Carter and Thirteenth streets, will purchase two or three portable air compressors of late model, and jackhammer drills.

DYER, TENN.—Common council plans bond issue for power plant, costing about $80,000.

HARTSVILLE, TENN.—City will soon call for bids for construction of waterworks system. Freeland, Roberts & Co., consulting engineer, Nashville, Tenn.

MEMPHIS, TENN.—Peerless Wire & Fence Co., 1051 Florida street, has a permit for remodeling and building an addition to its plant, costing about $12,000.

West Virginia

BARRACKVILLE, W. VA.—Bethlehem Mines Corp. plans to install heavy duty motors and controls, electric hoists, conveyors and other equipment for rebuilding of coal mining plant here, recently damaged by fire.

McMECHEN, W. VA. — City, Thomas Cooper mayor, is having a survey made for constructing power plant.

PINE GROVE, W. VA.—City has PWA loan of $44,000 for waterworks system.

Missouri

BRAYMER, MO.—City plans $45,000 waterworks system. J. W. Shikles & Co., 708 New York Life building, Kansas City, Mo., engineer.

Oklahoma

NORMAN, OKLA.—State board of affairs, Oklahoma City, Okla., plans to expend $250,000 for erection of administration building and $60,000 for shops at University of Oklahoma. R. R. Owens, efficiency engineer.

Texas

AUSTIN, TEX.—City, J. G. Morgan manager, is having specifications completed for sewage disposal plant equipment, sewage shredders, compressors, sludge pumps, air filters, etc., at a cost of $85,000.

BRYSON, TEX.—City has PWA loan of $30,000 for construction of waterworks system.

HOUSTON, TEX.—Una-Weld Mfg. Co. has been formed by E. W. Kronbach and Norton T. Jones to engage in metalworking.

PLAINVIEW, TEX.—City has secured PWA loan and grant of $423,436 for new city-owned electric light and power plant. Work will be started soon.

PORT ARTHUR, TEX.—Gulf Refining Co., Charles Stevenson general manager, is planning to construct a lubricating oil treatment plant, expending several hundred thousand dollars.

Wisconsin

LACROSSE, WIS.—Northern States Power Co. has awarded contract to Stacey Bros. Gas Mfg. Co., Cincinnati, for a steel gas holder storage tank. Total cost of project is $100,000.

MARSHFIELD, WIS.—Albert H. Weinbrenner Co., shoe manufacturer, 226 East Juneau avenue, Milwaukee, will soon start construction of a 3-story branch factory here, for the manufacture of about 4000 pairs of shoes daily.

MERRILLAN, WIS.—City has preliminary plans and is arranging financing through PWA for new city-owned hydroelectric power plant. Project will include power dam, power station and transmission line, with substation and distribution facilities. W. S. Woods, 304 Main street, LaCrosse, Wis., is consulting engineer.

MILWAUKEE—Fulton Co., West Allis, Wis., manufacturer of automobile accessories, is building an addition to provide greater paint and spray facilities.

MILWAUKEE — Delta Mfg. Co., manufacturer of woodworking and other machinery, expects shortly to move into a new plant at 620 East Vienna avenue, providing 60,000 square feet of floor space. H. E. Tautz is president.

MILWAUKEE—Heil Co., manufacturer of steel tanks, truck bodies, hydraulic hoists and other motor truck equipment, has embarked on an enlargement program estimated to cost $50,000 to $75,000.

TREMPEALEAU, WIS.—Harmon Electric Co., 724 South Cicero avenue, Chicago, is low bidder at $83,284 for power control and lighting system on United States government dam No. 6 in Mississippi river here.

Minnesota

GLENCOE, MINN.—City plans construction of a municipal light and power plant, including electrical distribution system and generating equipment. F. X. Eickmann is city clerk.

HIBBING, MINN.—City plans extensions and improvements in city-owned electric light and power plant, including installation of new turbine unit. Fund of $90,000 is being arranged through federal aid.

MINNEAPOLIS—Chicago, Milwaukee, St. Paul & Pacific railroad has awarded contract for construction of a 1-story round house addition, 110 x 150 feet, to cost about $35,000.

MINNEAPOLIS—Baker Iron Co. has been incorporated with a capital of $50,000 to manufacture ornamental iron products and boilers, by W. L. Baker, E. P. Baker and C. W. Swanberg.

WINONA, MINN.—Maj. Dwight F. Johns, district government engineer, 615 Commerce building, St. Paul, will receive bids until June 14 for power control and lighting system for lock and dam No. 5A, including power lines, lock grounding system, gas-electric stand-by power unit, hand-operated traveling bridge cranes, etc.

Iowa

CEDAR RAPIDS, IOWA—Dearborn Brass Co., manufacturer of plumbing specialties, plans rebuilding factory recently damaged by fire.

WATERLOO, IOWA—Cole Rendering Works, F. E. Cole president, has awarded contract for construction of a 2-story rendering plant, 42 x 82 feet, costing $35,000.

Colorado

DENVER, COLO. — Bureau of reclamation will take bids June 17

(*Please turn to Page* 89)

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(*Concluded from Page* 87)

for two sets of oil storage tanks with platforms, ladders, handrails and appurtenances for the Boulder dam power plant project.

Montana

BUTTE, MONT. — Basin Tunnel Co. plans expansion of its ore mill from 100 tons to 400 tons capacity and will install machinery and equipment, including hoisting engine with capacity of 2000 pounds.

EAST HELENA, MONT.—American Smelting & Refining Co., 120 Broadway, New York, plans construction of an ore mining and storage plant.

FORT BENTON, MONT.—Northern Elevator Co. plans rebuilding grain elevator recently severely damaged by fire.

Pacific Coast

EL CENTRO, CALIF.—M. J. Dowd, chief engineer, has been authorized by the directors of the Imperial Irrigation district to make application to PWA for loan of $13,500,000 to finance the construction of a hydroelectric power system.

FILLMORE, CALIF. — Fillmore Union high school district is taking bids for construction of a shop building to be erected at the high school. Plans have been prepared by Architect Roy C. Wilson, Say road, Santa Paula, Calif.

FRESNO, CALIF.—Fresno school district plans construction of a shop and warehouse building to be erected at Ventura and Eighth streets. Ernest J. Kump, Rowell building, architect.

LONG BEACH, CALIF. — J. K. Thomas has been awarded contract at $38,153 by the Long Beach board of education for construction of a shop building at the Alexander Hamilton junior high school, Long Beach.

LOS ANGELES—William Simpson Construction Co., 816 West Fifth street, has been awarded contract for construction of a plant for Max Factor, cosmetics manufacturer, to cost $25,000.

LOS ANGELES—O'Keefe & Merrit Co., 3700 East Ninth street, has applied for building permit to erect an addition to its Class A factory building.

SAN FRANCISCO — Ferry Sheet Metal Works, 980 Folsom street, will ask bids shortly for construction of an addition to its plant.

STOCKTON, CALIF.—Hancock Oil Co., P. O. box 810, Long Beach, Calif., is having plans prepared for construction of a gasoline distributing plant, office building and pump house, including installation of tanks and pipe lines. H. S. Halloway is in charge.

SEATTLE—Great Western Mining & Smelting Co. has been organized with $50,000 capital, by W. A. Martin and associates, 1216 Second avenue.

SEATTLE—Associated Oil Co. has received bids for a $10,000 addition to its local office at 1733 Railroad avenue.

Dominion of Canada

VANCOUVER, B. C.—Standard Oil Co. of California has purchased a 40-acre site on Burrard inlet for erection of an oil refinery, to be in operation next fall. Estimated cost $1,000,000.

NIAGARA FALLS, ONT.—Burns Mfg. Co. is planning to establish a plant here for the manufacture of cutlery, etc.

PETERBORO, ONT. — Western Clock Co. will build a 2-story addition to its plant here at a cost of $50,000.

SAULT STE. MARIE, ONT. — Chromium Mining & Smelting Corp., Ltd., 700 Bank of Commerce building, Hamilton, Ont., has purchased the plant of Superior Alloys Ltd., Sault Ste. Marie, for the refining of chromium ore from its property at Collins, Ont. Alterations will be made to the plant and additional equipment added. A. R. Globe is president and general manager.

TORONTO, ONT.—House of commons, Ottawa, has passed a bill authorizing the Dominion government to guarantee $8,000,000 of Canadian National railway and $7,000,000 Canadian Pacific railway equipment certificates. Financing will be proceeded with immediately and contracts for equipment placed without delay. Under the new plan about $4,000,000 will be spent in the railway shops and $11,000,000 distributed among private companies.

WINDSOR, ONT.—Ford Motor Co. of Canada Ltd. will build a $2,000,000 plant addition here to increase production next year. W. R. Campbell is president.

Works Program Applications

The following are applications filed with the division of applications and information of the President's work relief program, in Washington, for allotment of funds. An application does not necessarily indicate the program will mature:

Panama Canal Zone

BALBOA—Shops at Fort Amador; shops and general repairs at Quarry Heights.

COROZAL—Extension to machine shop at Corrundu reservation; repair shops at Corozal general depot; general repairs at Fort Clayton.

CORUNDO RESERVATION—Hangars at Albrook field.

CRISTOBAL — Garage at Fort Randolph; hangars at France field.

GATUN—Shops at Fort Davis.

Hawaii

HONOLULU—Utility shops at Tripler General hospital; filtration plant and transportation shed and shop at Schofield barracks, Wheeler field.

Texas

SAN ANTONIO, TEX.—Completion of hangar at Randolph field; erection of shops at Kelly field and Brooks field; pump house at Duncan field.

Utah

SALT LAKE CITY, UTAH—Garage and shop at Fort Douglas.

Virginia

ALEXANDRIA, VA. — Blacksmith shop and shops at Fort Belvoir.

HAMPTON, VA.—One single and six double hangars at Langley field.

RICHMOND, VA. — Replacement of lighting plant.

Oklahoma

LAWTON, OKLA.—Garage and shops at Fort Sill.

Pennsylvania

PHILADELPHIA — Reconditioning power plant at Frankford arsenal.

Pacific Coast

TACOMA, WASH.—Utility shop and incinerator at Fort Lewis.

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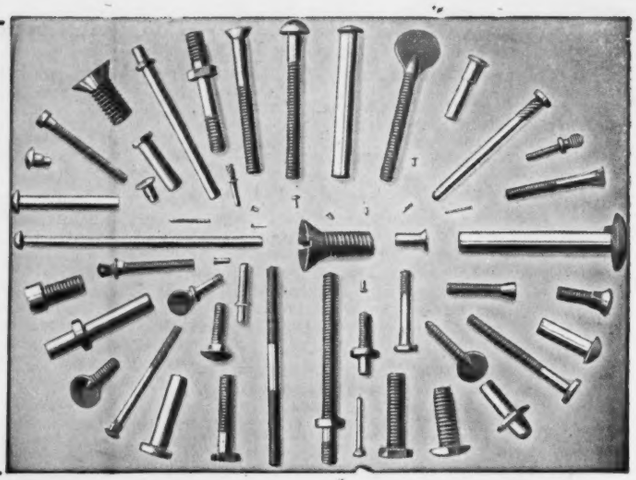

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